

A STUDY OF THE LOCAL INDUSTRIAL RESOURCES, THEIR AVAILABILITY,
AND EXTENT OF USE IN THE TEACHING OF INDUSTRIAL ARTS
IN THE DALLAS INDEPENDENT SCHOOL
DISTRICT, DALLAS, TEXAS

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TABLE OF CONTENTS

	Page
LIST OF TABLES	v
Chapter	
I. INTRODUCTION	1
Statement of the Problem	
Need for the Study	
Specific Purposes of the Study	
Limitations of the Problem	
Definition of Terms	
Sources of Data and Information	
Plan of Procedure	
Recent and Related Studies	
II. SOME VALUES RESULTING FROM THE USE OF LOCAL INDUSTRIAL RESOURCES	12
III. THE PHILOSOPHY OF THE DALLAS INDEPENDENT SCHOOL DISTRICT AND POLICIES CONCERNING FIELD TRIPS	30
IV. TYPES OF LOCAL INDUSTRIAL RESOURCES LOCATED IN DALLAS, TEXAS	46
V. THE AVAILABILITY OF LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS PROGRAMS	
The Metal Industries	
The Wood Industries	
The Electric and Electronic Industries	
Paint, Varnish and Wood Finishing Industries	
VI. THE EXTENT OF USE OF LOCAL INDUSTRIAL RESOURCES AVAILABLE TO THE INDUSTRIAL ARTS PROGRAM	109
VII. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . .	116
Summary	
Findings	
Conclusions	
Recommendations	

APPENDIXES	124
Appendix A	
Appendix B	
BIBLIOGRAPHY	140

LIST OF TABLES

Table	Page
I. Employment by Major Industries in Dallas County	51
II. Characteristics of the Population of Dallas, Dallas County and the United States	53
III. Industrial Firms Located in Dallas, Texas . .	55
IV. Responses Received from 130 Companies Engaged in Manufacturing in Dallas, Texas, Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	59
V. Responses Received from Seventy-one Companies Engaged in the Metal Working Industries Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	62
VI. Responses Received from Ten Companies Engaged in Foundry Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	64
VII. Responses Received from Five Companies Engaged in Welding Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	66
VIII. Responses Received from Eight Welding Equipment and Supply Companies Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	68
IX. Responses Received from Nine Companies Engaged in Sheet Metal Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	70
X. Responses Received from Two Sheet Metal Equipment Companies Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	72

XI. Responses Received from Nine Companies Engaged in Machine Shop Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	74
XII. Responses Received from Four Metal Machine and Equipment Companies Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	76
XIII. Responses Received from Sixteen Companies Engaged in Ornamental Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	78
XIV. Responses Received from Eight Companies Engaged in Steel Fabrication Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	80
XV. Responses Received from Twenty-seven Companies Engaged in the Woodworking Industries Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	83
XVI. Responses Received from Six Companies Engaged in Store Fixture Manufacturing Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	85
XVII. Responses Received from Sixteen Companies Engaged in Furniture Manufacturing Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	87
XVIII. Responses Received from Two Companies Engaged in the Manufacture of Wood Products Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts .	89
XIX. Responses Received from Two Companies Engaged in Woodworking Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	91

Table	Page
XX. Responses Received from One Company Engaged in Architectural Woodworking Concerning Their Availability as a Local Industrial Resource for Use in Industrial Arts	93
XXI. Responses Received from Sixteen Companies Engaged in the Electrical Industries Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	94
XXII. Responses Received from Four Companies Engaged in Electrical Equipment and Supply Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	96
XXIII. Responses Received from One Company Engaged in Electro-Mechanical Work Concerning Their Availability as a Local Industrial Resource for Use in Industrial Arts	98
XXIV. Responses Received from Three Companies Engaged in Electronic Equipment Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	100
XXV. Responses Received from Six Companies Engaged in Electro-Plating Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	102
XXVI. Responses Received from Two Companies Engaged in Electronics Work Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	104
XXVII. Responses Received from Sixteen Companies Engaged in Paint, Varnish, and Finish Manufacturing Concerning Their Availability as Local Industrial Resources for Use in Industrial Arts	106
XXVIII. Responses Received from 130 Companies Concerning the Extent of Their Use as Local Industrial Resources in Industrial Arts. . .	110

Table	Page
XXIX. Responses Made by Forty-seven Industrial Arts Teachers Indicating the Extent to which Available Local Resources are Used in the Industrial Arts Program	112
XXX. Seminars Organized and Conducted for Industrial Arts Teachers in the Dallas Independent School District during the Years of 1952 Through 1956	114

CHAPTER I

INTRODUCTION

American educators have made serious attempts to make the educational system a more vital structure in community life and to utilize the physical and social environment outside the school. The story of the development of our contemporary industrial society is constantly being marked by new milestones of progress. Advancing technological development, specialization, and industrialization tend to bar youth from direct experiences in society.

Rapid increases in the industrial growth and population of Dallas, Texas, present the problem of maintaining an educational equilibrium with society. This problem is in the process of continual magnification because of rapidly advancing technology.

Educators have suggested methods of coping with the problems of the physical and social environment outside the school. A frequently suggested method is the community survey. The community survey, however, should be undertaken only after a careful study of the many aspects pertinent to an educational program has been made.

The industrial arts program, as a phase of the general educational program, includes the study of the tools,

materials, processes, products, problems, and occupations of industry. By conducting a survey of the local industrial resources, a better understanding of these educative forces in a given society should be obtained. Obtaining these educative environmental resources should tend to help develop an evaluative criterion by which the needs of the students in the industrial arts program of the Dallas Independent School District may be determined.

Statement of the Problem

This is a study of the local industrial resources, their availability, and the extent of their use in the teaching of industrial arts in the Dallas Independent School District, Dallas, Texas.

Need for the Study

Manufacturing in the home shifted to the factory during the industrial revolution, thus removing from the home the opportunity for young people to satisfy their tendencies to explore and create by using tools and materials. The opportunity to understand the world of practical affairs to which the young people must some day adjust, whatever their own pursuits may be, was also removed. The understanding of the world of practical affairs, to which young people must adjust, should be provided as a phase of general education. A study utilizing scientific and mechanical devices and modern

industrial procedures offers exceptional opportunities for an intellectual culture.

The estimated increase in the population and manufacturing facilities in Dallas, Texas, is indicative of the society that will exert its influence on the people in this area. Individuals in this area will be affected by advancing technology and may maintain better an equilibrium in the resulting society by understanding the needs and demands made by that society. The educational program should be determined by the needs of the society to be served, the character of the individuals to be educated, and the knowledge of theory and practice available. These factors are by no means static, as society is always in the process of development and modification. It follows, therefore, that educational theory and practice will furnish constantly new information and should be guided by a clear concept of the meaning of democracy.

Specific Purposes of the Study

The purpose of this study is fourfold: first, to study the local industrial resources; second, to assemble and analyze data concerning the availability of industrial resources for instructional enrichment of the industrial arts program; third, to assemble and analyze data concerning the extent of use of available industrial resources in teaching industrial arts in the Dallas Independent School District; and fourth, to make recommendations and conclusions based on the findings of the study.

Limitations of the Problem

This study was limited to analysis of the industrial firms manufacturing and/or dealing in commercial products and located in Dallas, Texas.

This study was further limited to local industrial firms in four major industrial areas, as listed in the 1956 Key To Buying in Dallas (2). These four areas are as follows: the metals area which included seventy-five industrial firms which are as follows: ten foundries, six welding firms, eight welding supplies and equipment companies, nine machine shops, four metal working machinery companies, sixteen manufacturers of ornamental iron products, and nine firms dealing in steel fabrication. The wood area included thirty-one firms which are as follows: seven manufacturers of store fixtures, nineteen manufacturers of furniture, two firms engaged in the manufacture of wood products, two woodworking firms, and one architectural woodworking firm. The electrical area included twenty-three firms which are as follows: six companies engaged in supplying electrical equipment and supplies, one electro-mechanical equipment firm, six manufacturers of electronic equipment, three electronics firms, and eight electroplating companies. The paint and varnish area included twenty-one manufacturers and one company engaged in supplying wood finishing equipment and supplies.

A further limitation of the study is that it included the responses of only forty-seven of the fifty-six industrial arts teachers in the Dallas Independent School District during the 1955-1956 school year.

During the course of the study, it was necessary to delimit the study further because a number of manufacturers and industrial arts teachers could not be located. These limitations are as follows: interviews were held with the executives representing only seventy-one metal industries; twenty-seven wood industries; sixteen electrical and electronic industries; and sixteen paint, varnish, and wood finishing industries.

Definition of Terms

The phrase "local industrial resources" refers to industries located in the Greater Dallas Area and listed in the Key To Buying in Dallas (2), 1956 edition, the official directory of Dallas manufacturers, wholesalers, distributors, jobbers, manufacturers' representatives, and factory representatives engaged in the manufacture, fabrication and distribution of products.

The phrase "availability of industrial resources" is interpreted to mean those industries providing or making available information and services for instructional enrichment of the industrial arts program in one or more of the following methods; one, industries allowing class visitation;

two, teacher visitation; three, providing a resource person from that industry for the purpose of assisting with seminars for the industrial arts instructional staff of the Dallas Independent School District; four, providing a resource person to visit industrial arts classes for the purpose of delivering information; five, providing literature pertaining to given materials and processes as related to and applicable for instructional purposes; and six, provide sample products in reasonable amounts for instructional use in industrial arts classes.

"Industrial arts program" refers to that phase of the general education program that is designed to develop within the individual an interest in industry and an understanding of the industrial processes common to modern society through the study of tools, materials, and production processes and an application and understanding of consumers' problems and needs as an aid in becoming a successful citizen in a democratic society.

The term "community resource" as used in this study refers to any local industrial resource, either human or material.

"Extent of use" refers to the ways which local industry is used.

Source of Data and Information

The data and information for the study were secured through the utilization of both human and documentary sources. The primary sources included in the development of the study were personal interviews held with local industrial arts teachers, managerial staffs of the manufacturers, and manufacturers' representatives. The secondary sources included professional publications, publications by the Dallas Chamber of Commerce, the Texas Employment Commission, and the United States Bureau of the Census.

Plan of Procedure

Since the interview method was used to secure some of the data, interview forms were designed, constructed, and used to secure and record data used in the study. The interview forms were organized around a common core of questions which were believed to be pertinent.

The forms were constructed as an interview "probing" guide and not designed to be a limiting factor in the interview. Copies of the interview forms appear in the appendix. The main portion of the interviewing was completed during the months of July and August of 1956. An attempt was made to conduct all interviews with the same degree of formality.

Chapter I contains the statement of the problem, procedure of the study, discussion of the method of collecting the data, and an outline with respect to the organization and treatment of the data.

Chapter II of the study presents some of the values possible through the use of local industrial resources for the instructional enrichment of an educational program with special attention to the values pertaining to instruction in industrial arts.

Chapter III presents the philosophy of the Dallas Independent School District, policies governing field trips, and information concerning the industrial arts program.

Chapter IV presents data concerning local industrial resources found in the Greater Dallas Area. These data were analyzed in order to determine the following: the number and types of local industry, probable trends in citizen and industrial population, and the estimated present and future needs with respect to the environmental structure of the community.

Chapter V presents data and information concerning the reactions of a number of industrial firms with respect to the use of materials, literature, and personnel as resource materials and persons. Data concerning the extent of use of available industrial arts resources in the Dallas Independent School District are presented in Chapter VI.

Chapter VII contains the summary, findings, conclusions, and recommendations based on the findings of the study.

Recent and Related Studies

The necessity of keeping abreast with the industrial development of our present technological society has caused

educators to wonder about individual and community needs. Several studies have been made recently in relation to this problem. These studies have, for the most part, been made in specific localities in order to determine the needs and interests of the people involved. Some of the conclusions were that the local industrial environment should control the industrial arts offerings in our educational institutions, in order to increase the effectiveness of the program.

Woodward (4) conducted a study of the community resources in Wise County, Texas. This study included a survey of all the resources of the county and a survey to analyze the utilization of these resources. Woodward concluded that the utilization of the local resources was not adequate and recommended that a more adequate program of utilization of educational resources be established by the schools of Wise County.

In 1950, Pollan (3) conducted a study to determine a sound plan of using Ferris County resources as instructional aids. A survey of the local resources and of the utilization by the school was made. Based on the data collected, it was concluded that the use of the available community resources as instructional aids was democratically, psychologically, and sociologically sound.

In the study entitled "Local Industrial Arts Resources Pertinent to Schools of Pinellas County, Florida," Boyd (1) suggested that a study of the industries would supply a

source for comparison for the industrial arts students, for a study of anything, if limited to one, will allow no comparison; therefore, the study will probably be opinionated, narrow, and biased.

According to the answers reported on the questionnaire, the majority of the industrial arts teachers of Pinellas County agreed that resource utilization was unsatisfactory. They were of the opinion that some adequate steps should be taken toward the utilization of more local resources in the industrial arts program.

In summary, Boyd had this comment to make:

As one stands upon the threshold of this new age and thinks of Snorkels, planes with supersonic speeds, flying saucers, guided missiles, and a long list of others, he is led to wonder why industrial arts is not the core instead of the frill of modern education. No segment of American society can live apart from industrial arts, for its essence is the American way of life. (1, p. 50).

This probably was an expression of the feelings of the industrial arts teachers in one area of Florida and may express the feelings of industrial arts teachers throughout the nation.

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CHAPTER II

SOME VALUES RESULTING FROM THE USE OF LOCAL INDUSTRIAL RESOURCES

One of the current and important educational trends is the recognition of the community by the school and the influences and educative forces that have an ever-changing presence in society. Education should be determined by the needs of the society to be served, the character of the individuals to be educated, and the knowledge of theory and practice available.

For many years the schools were merely independent institutions existing within the community with little or no connection with the real interests and functions of the community or its citizens. Co-ordination of the educational programs and community plans in the past probably has occurred on rare occasions and perhaps only by some chance happening. The school had its purposes and plans, and the community had its interests and activities. These educative forces present in society should, for the benefit of the citizens involved, co-operate in planning a vital program for educating the youth of the nation. This planning should be guided by a clear understanding of the meaning of democracy; the ideal of democracy is that the individual and society may find

fulfillment in each other and that democracy sanctions neither the exploitation of the individual by society nor the disregard of the interest of society by the individual.

The factors involved in planning a program of educational experiences by the school and community are by no means static. The sciences on which educational theory and practice depend constantly furnish new information related to the modification of the character of the school population and the continuous process of development by society. An understanding of a community's continuous modification and development can be attained through a comprehensive and systematic study of the community. Study should provide a basis for making revisions and reorganizations in the learning experiences available in the classroom and the educational system as a whole. The community is a laboratory filled with cultural, civic, economic, and social problems which will serve as an immediate and practical program for every school system.

The use of the community as a directing agency for education was emphasized by Misner as follows:

The school can no longer be conceived as the sole agency of education. The life activities of the community itself must furnish the basis for an educational program in which all persons, adults as well as children participate . . .

To be realistic, education must seek learning situations within the activities and problems of community life (8, pp. 56-57).

The educational program should be recognized as a community responsibility with the goals determined or defined by the

democratic process based on interaction and widespread participation of different segments of society.

The idea of working co-operatively toward a goal which no one can describe may appear to be an unwise venture, yet the modern concepts of educational philosophy indicate the need for constant reorganization and re-evaluation of the learning situations. Mead expressed a view concerning the constant reorganization, as follows:

We can have no clear vision of a final form which we want society to take; for the minute that we have such a vision we begin to educate, cajole, force people, identified living human beings, to get into the pattern which we have conceived as good for them. . . . If we turn our attention towards processes, towards directions, and away from fixed plans into which we attempt to fit living human beings, we deal immediately with an open-ended system, a system in which we cannot know what the outcome will be . . . (7, pp. 187-190).

This constant change does not place limitations on human endeavors to improve the educational offerings to the students. Urwink (13, pp. 113-114) believes that the necessary goals toward which society aims can be reached and maintained when the individual recognizes the fact that goals must evolve concurrently with the needs of society. All the members or representative members should participate in the society of which the schools are only a part.

Learning is an individual process constantly taking place within a person as he interacts with his environment. The increased complexity of our society has again re-emphasized

the demands that the perpetuation and improvement of society and the direction of adjustment and adaptation of the individual should be given through planned experiences in the school. Meaningful linkage of the school and other environmental agencies should result in experiences designed to influence the individual learner in a more desirable direction and to a greater degree than would otherwise occur. This linkage of the school with other educative forces in the community has been expressed by Grinnell as follows:

The school is only a particular sector of the educational environment, the neighborhood, the town and all its agencies and organizations. Churches, schools, the nations, the world, are all impinging upon and modifying the human experience for good or evil. It is obvious that education of the child in every aspect is and must be a co-operative and integrated endeavor, for the school is but one agency in the process. Directed educative experience demands a common cooperative endeavor and outlook on the part of all concerned (especially the school) to harmonize home, school and community interests, resources, agencies, materials, and institutions for the benefit of all children. It is important that teachers plan and bring about educational experiences for their pupils in the light of out-of-school activities, needs, conditions, and forces (4, p. 7).

Utilization of community functions is an essential requirement for gaining the desired educational values through enriched activities which foster the child's growth as a happy, efficiently-functioning member of society. "If the community is fully to serve its purpose, the school must work with all other public agencies to achieve a comprehensive movement for the community as a whole (10, p. 165)."

Kendall expressed the view that utilization of community functions is essential for gaining desired educational values by recognizing the fundamental psychological law of learning in terms of the individual's experiences. The individual, in his community, is constantly confronted with new situations involving the environmental influences that exert their pressures as an educative force.

The modern school is something more than an institution for training the individual child in subject matter that will enable him to climb the educational ladder to higher academic levels.

It is an institution whose program and procedures must be indigenous to the needs of the pupils and to the community it serves. The two fundamental factors in the educational program are the pupil and the environment in which he lives. The primary environmental influences are the home and the community, and any educational procedure that neglects these influences will violate the fundamental psychological law that individuals learn and understand in terms of their own experiences. The discovery and use of community resources are necessary if the school is to assume the role of social agent and if the curriculum is to bring about desirable changes in the pupil and his community (6, pp. 348-349).

Environmental influences are recognized by more modern educators today as the determining factor of the educative process. The mutual contract for social and economic advancement of our society is being cemented together by recognition of the common problems of all community agencies. These problems are being attacked by communities which have different structures, but the method of attack is similar in different communities.

The educative values of community resources have been recognized by many in the field of education. Dakin emphasized the school and community relationships as follows:

Recognizing the potency of environment in character formation, our schools are seeking to make direct contacts for children through field trips, studies of community resources, and the use of concrete material assembled by the pupils themselves. This groping toward realism is handicapped by the traditional cleavage between formal education and the vast range of activities in which children pass some ten hours every day outside of school (2, p. 13).

The hours spent each day outside of the classroom definitely exert their influence on children in the community, and the everyday problems are more concrete outside classroom situations when classes do not take community problems into the curriculum planning.

The increased use of methods of teaching other than the printed page and spoken word are becoming increasingly recognized. This was discussed by Young as follows:

It is becoming increasingly recognized that not all the basis for educational experiences are printed or spoken words which are substitutes for objects, movements, and other actualities in our environment. As has been pointed out often in the discussions of audio-visual aids, a much better impression and understanding may in many instances be obtained from seeing and hearing objects and actions than is obtained by reading about them. There has been, therefore, in recent years a trend toward greater employment of community resources. Learners are being taken out of the school buildings to various places in the community to see, hear, and handle things, which result in good learning experiences. In addition, many types of community resources are brought into the classroom, including problems, graphs, and pictures. Persons having particular

information concerning specific fields may come to the classroom or auditorium and present coordinated ideas definitely superior to descriptions in books or of the professor or instructor (4, p. 8).

There is an increasing belief that resource information may increase the value of the educative process by enriching the educational offerings. The number of the values received from use of community resources will vary, but schools will have at least two important reasons for a better understanding of school-community activities. First, the development of a community-centered curriculum has been a major approach to the reorganization of the school curriculum; second, "regardless of the over-all curriculum plan, subject or case or community-centered, the community offers a rich learning situation for young people" (1, p. 478). Whether the school is concerned with the guidance of learning outside school or not, the fact remains that students spend more time outside of school than in school and are learning outside as well as in school.

The gradual shifting of educational institutions into a more community-oriented and community-related program is evidence that some of the educational programs are providing the community with the type of school program that is designed to meet the ever-changing needs of youth and society. Some of the main characteristics of programs that are community-related or community-oriented were listed by Oliver as follows:

1. Teaching more of the applications of subject matter to life problems and situations.
2. Organizing instruction around life problems and needs.
3. Taking learners into the community field trips, excursions, assignments, interviews, camping, work experience, and similar activities.
4. Bringing the community into the schools through a wide variety of audio-visual materials.
5. Making learning situations in the school more like life in the community.
6. Participation of individuals and groups of the community in planning and improving instructional materials and learning activities, especially through the use of advisory groups.
7. Acquainting the community with the purposes, programs, activities, achievements, and changes in the work of the schools.
8. Developing more comprehensive and effective understanding and good will on the part of lay persons.
9. Employing laymen with particular information to lead discussions in classes, to be interviewed, or to lecture.
10. Using objects and printed material available in the community as learning materials (4, pp. 20-21).

In the community related program the student sees his class-work related to the life around him. The school becomes more functional when the learning experiences have an application to actual life situations. Students are more aware of the fact that the community depends on such individuals as themselves.

The community-related program does not exclude the use of textbooks or the study of the cultural heritage of other peoples and places, but rather it means that the learning experiences are not limited to a textbook or to one teacher. The wealth of community resources should constantly provide new avenues of learning and teaching in any school situation. Use of the community resources sometimes makes learning more interesting and thereby more learning takes place. The use of community resources as a stimulus was discussed by Wilber as follows:

People and places are more stimulating to a large percentage of children, as sources of learning, than are books. The reasons for this are obvious. Printed materials cannot be kept up to date. Many children cannot read what is in print. Reading is passive and involves imagination and association of ideas on a high mental level. Talking to people and seeing places afford activity and direct, exciting experience. Contacts with people in the community are secured by taking classes out to visit places of interest related to the unit of learning, by sending committees out to interview individuals who can provide the needed information, and by inviting qualified people to come into the classroom to speak to the children about the subject they are studying (14, p. 90).

The educational values resulting through the use of community resources appear evident.

This study was designed to concentrate on a particular phase of community life, that of industrial resources in the community which could contribute to the enrichment of the industrial arts program. As industrial arts has been defined, it appears logical that the study of the tools, materials,

and processes of industry could be accomplished with far greater understanding by using industry as much as possible. There are many possibilities for using local community resources as stated previously, and the use of these resources has been advocated by leaders in the field of industrial arts for many years. Brown advocated the use of community resources as follows:

Leaders in industrial arts education have advocated for many years that industrial arts experiences should help students develop insights and understandings of the impact and importance of industry in American life. This study indicates that teachers do not make extensive use of methods which require rapid learners to read books, make community studies, go on industrial visitations, or conduct interviews with industrial labor leaders (12, pp. 72-73).

The lack of use of local industrial resources as indicated by Brown may be related to several reasons. In some instances the teacher may not realize the value of community resources. The use of industry may have been discussed often but practiced infrequently in the teacher's college preparation. Administrative policies of the local industry may prevent the use of community resources.

Some important reasons for not making use of community resources, according to Ericson, are as follows:

It is to be regretted that in large cities the transportation problem, accident hazards, distance to industries, personal responsibility to the instructor, and other considerations may have combined to discourage field trips of this nature (3, p. 182).

Regardless of the cause or the causes for the lack of use of community resources, the final value of the pupil understanding may be decreased by the failure to use facilities at hand to make educational purposes more meaningful. Many schools are controlled by tradition and a very conservative program of studies because many communities tend to resist change. This tradition in many cases results in a classroom situation that is removed from any practical-motivated situations. The problem-solving method may give pupils more ways of solving a wide range of problems. The reasons for using the problem-solving method were stated in the bulletin entitled, A Look Ahead In Secondary Education (11, p. 86), as follows:

The basic assumption under the program of required subjects is that uniform program insures, to some extent, uniform learning results. This assumption has been challenged, and the desired outcomes from a standard program are sometimes compared with the relatively uniform results of varied programs. Safety may be learned in a variety of experiences and is learned best in situations where the learner is highly motivated. The same may be true of other knowledges, skills, attitudes, and desired outcomes. Problem-solving, with about the same results, may be learned in many courses in agriculture or home economics, or in social studies and a number of other subject fields. The experiences at the work-bench in a shop may be more effective in showing many pupils the way to solve a wide range of problems than the assigned reading they do at the table in the library (11, p. 86).

Some teachers realize the educational advantages and values gained through experience at the work-bench in the industrial

arts laboratory as an effective method of solving a wide range of problems. In addition to the work-bench method of problem-solving, some teachers realize the value of using local resource information in many ways.

The aforementioned point of view was expressed by Ericson:

Well-organized visits to industrial plants, buildings under construction, drafting rooms, and other places where the world's work is being done, are valuable in broadening the students' views of occupations and their possibilities, as well as learning related and scientific facts. Next to actual participation in the occupation, this method is probably the most effective for obtaining a fairly true picture of the work of an occupation and the conditions under which the work is done (3, p. 181).

The importance of using local industrial resource information will be limited in value to the individual's capacity to utilize the available knowledge. Leaders in the industrial arts field advocate the use of community resources, but according to Wilber:

Relatively little has been written concerning the use of community resources by industrial arts classes. This is somewhat strange, in light of the importance of the subject both from the standpoint of strengthening relationships between the industrial arts department and the public and from the standpoint of effectiveness in teaching (14, p. 227).

According to Wilber the use of only a portion of the resources available, that of human and material and its relation to local industry, has tremendous wealth for the enrichment of the industrial arts program.

The method of using a community survey for determining available local resources is recommended by many educators. The importance of surveying a community to ascertain needs for industrial arts was emphasized by Newkirk as follows:

In order to extend industrial arts beyond the things common over the county, it is advantageous to make a study of the needs of a community before deciding upon the type of work that is best fitted to it. This survey is especially valuable in determining whether or not there is urgent need for special guidance work with respect to local industries. In a small town located in an agricultural community with no industries, it takes but a short time to make such a survey. On the other hand, in a large city it may take careful and extensive study to find out what the industries are, together with their relative sizes and importance (9, pp. 40-42).

A survey of the needs of industrial arts in a community could aid in the improvement of the industrial arts program.

It is possible perhaps to list myriad reasons for the consideration of local resources, but these reasons may best be combined into a few general reasons. Wilber listed four valid reasons for utilizing local community resources for the industrial arts program as follows:

The utilization of community resources for industrial arts purposes is important for the following reasons: (1) relationships between the school and the community may be improved; (2) local resources are brought to the attention of students; (3) educational efficiency may be increased; and (4) otherwise unavailable materials are provided. The community resources include the industries, libraries, business concerns, individuals, museums, and such materials as metals, woods, textiles, clays, and stones. Better relationships and a more complete knowledge of the community are usual results of a program to utilize the available resources (14, pp. 234-235).

The values evolving from resource utilization may be listed many ways; the final value, however, appears to be the value each individual student receives in the way of meaningful understanding of himself in relation to his community.

The utilization of local industrial resources in an industrial arts program depends primarily upon the objectives of the program. Course objectives will, by necessity, control the planning and organizing of any industrial program; and these objectives may vary in different locations and communities. In order that the industrial arts program in Texas could be more clearly defined, a twenty-three-member committee, representing the public schools and the teacher education institutions, compiled a proposed list of objectives for the industrial arts program in Texas. This committee emphasized that industrial arts in that phase of general education makes many contributions through the study of the industrial element of our culture. This committee listed nine proposed objectives for industrial arts which are as follows:

1. Interest in Industry. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.
2. Appreciation and Use. To develop in each pupil the appreciation of good design and workmanship and the ability to select, care for, and use industrial products wisely.
3. Self-realization and Initiative. To develop in each pupil the habit of self-reliance and resourcefulness in meeting practical situations.

4. Co-operative Attitudes. To develop in each pupil a readiness to assist others and to join happily in group undertakings.
5. Health and Safety. To develop in each pupil desirable attitudes and practices with respect to health and safety.
6. Interest in Achievement. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.
7. Orderly Performance. To develop in each pupil the habit of an orderly, complete, and efficient performance of any task.
8. Drawing and Design. To develop in each pupil an understanding of drawings and the ability to express ideas by means of drawings.
9. Shop Skills and Knowledge. To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair (5, p. 5).

In developing the educational objectives for the industrial arts program in Texas, the committee used three steps in preparing each objective as an effective learning guide. These three steps were: "(1), Translate each objective into the behavior change desired; (2). List the activities that will result in the desired behavior; (3). Establish an evaluation plan for each objective (5, p. 2)." By using these steps as a basis to analyze each objective, the teacher may realize the value to be gained. The value of the objectives of the industrial arts program is of vital importance to the teacher, and the use of industrial resources can help to achieve these objectives. The exploration and use of local

resources open possibilities of instructional enrichment that appear to be unlimited in scope.

A knowledge of the available resources is essential in any program designed to utilize local industrial resources. Only through a study of the industries and personnel available as resource material can an educational program utilize them effectively in planning and directing the learning experiences and activities of youth.

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CHAPTER III

THE PHILOSOPHY OF THE DALLAS INDEPENDENT SCHOOL DISTRICT AND POLICIES CONCERNING FIELD TRIPS

The first consideration that should be given to any educational program should be the basic philosophy upon which the program is based. The educational philosophy in a sound program will serve as a guiding and directing, but not a limiting, force in the advancement of the program. Giachino expressed his views in this area of thinking, as follows:

Any educational program must have as its supporting base a sound educational philosophy. A philosophy furnishes the direction or incentive that makes possible a particular kind of education. If the philosophy is inadequately defined or narrow in scope it logically follows that the resulting educational program will also be limited. In other words, the type of education established in a community depends considerably on how well its educational philosophy has been conceived.

The usual practice is for a school system to have what might be referred to as an "over-all" type of philosophy which stipulates the nature of its total educational program (2, p. 48).

In reference to the over-all philosophy of the Dallas Independent School District, Dallas, Texas, the entire professional staff working in conjunction with members of the community undertook to formulate a statement of philosophy for the program. Community groups contributing to the formulation of this philosophy included the following: Parent-

Teacher Associations, dads' clubs, service clubs, civic groups, professional associations, social service organizations, and all other organizations listed for human welfare or professional purposes. This type of community-minded co-operation brought forth a statement of philosophy for the Dallas Independent School District which is as follows:

1. Basic function of education

It is the basic function of education to provide developmental experiences through the stimulation of thought and the projection and realization of worthy purposes. Since these experiences insure to each individual the most complete physical, mental, and spiritual attainment possible, they fit him to assume his place as a constructive member of society. Moreover, the skills, the habits, and the attitudes resulting from these experiences largely equip him to meet the demands and requirements of his own daily living.

2. Goal of public education

Public education, then, accepts the child as he is and endeavors to give direction and purpose to his growth and development. A status quo for either society or the individual is unwholesome. As the individual grows into a different person, so does society change. The goal of public education is the orderly, purposeful growth both of the individual and of society.

3. The individual in the face of a changing world

The individual learns that certain fundamentals do not change even in the face of a changing world. True education gives him clear concepts of the basic principles of life, and arouses a sense of social and spiritual values; all of these combine to produce a high moral code, lofty ideals, and intellectual integrity. Since surface changes are inevitable, the individual must be able to adjust himself wisely and to work for those changes most beneficial to the particular needs and ambitions of himself and of society.

4. Emphasis in education

Emphasis in education varies according to the needs and capacities of the individual and in keeping with the situation concerned. Proper emphasis is placed on utilitarian knowledge and skills. Although the spirit of this generation is one of technological and scientific discovery, it is not forgotten that the culture of the ages is a potent factor in the constructive growth of the individual and in the progress of society.

5. Present-day living and preparation for living in the future

As the child is seen in school today, and foreseen in adult society tomorrow, this conclusion is inevitable: Present-day living in school and preparation for living in the future are equally important. These two stages are different in that one, successful living in the future, is the ultimate goal; while the other, present-day living, is the immediate goal and the means by which the ultimate goal is attained. Education results from actual living, from receiving instruction and training and from independently making preparation. Instruction and training have implications for the future. Society defrays the cost of education and is chiefly interested in the future adult. The future adult emerges from the kind of life the child leads from day to day; hence, for the child, day-by-day living is all important because he is experiencing life today and because present-day experiences (instruction, training, and individual thinking) condition his future.

6. Education of all members of society

The public school is responsible for the education of every child in the community. Compulsory education is provided for every youth of legal school age except the individual who has completed the four-year high school course or has reached the maximum realization of his capacities.

7. What should be expected of the pupil

As the child grows he should develop a constantly increasing ability to think independently,

and this ability should be limited only by this stage of development and his native capacity. Our schools provide an environment that will carry the child through experiences in which he makes decisions, solves problems, and arrives at conclusions. The acquisition of knowledge and accepted cultures constitutes a sustained growth, determined by the child's needs, interests, and abilities. This growth enables him to meet intelligently the varying conditions of society. Habits of persistence and industry develop in the child originality and the ability to express himself creatively. These habits stimulate him to give serious thought to his community and to assume his proper share of its responsibilities. This requires that he develop qualities of co-operation with constituted authority and unswerving loyalty to it.

8. The individual and his self-realization

The school assists the child in mastering, to the fullest extent of his ability, the fundamental tools of learning: ability to speak, read, and write his mother tongue clearly and effectively; ability to use the fundamental operations of mathematics required in every-day transactions; ability to acquire a knowledge of his environment so that he may adjust himself properly; ability to employ the five physical senses to the maximum aesthetic and practical possibility. The school and the home share several responsibilities: Both the home and the school must through mutual co-operation (1) lead the child to realize the importance of health and the best means of achieving and preserving health, (2) provide profitable recreation and right use of leisure in order that the child may develop both present and permanent interests, (3) nurture experiences which will lead the child to acquire those constructive, optimistic, and altruistic ideals and attitudes which are conducive to acceptable behavior and sound principles of conduct.

9. Leisure

The economic and industrial world will, in the future, increasingly require a much smaller portion of the individual's time than is now necessary for vocational endeavor. Accordingly, the child now in school develops avocational and recreational interests which will enable him to live happily and profitably

during his leisure hours. This condition places on the school the great responsibility of helping the child prepare himself in the arts, in literature, and in other nonvocational cultures so that his adjustments and interests may be stable and worthwhile.

10. Areas of human experience and the curriculum

The curriculum, the vehicle through which educational experiences are offered, is presented in accordance with a scientific study of individual growth. Group guidance, curricular and co-curricular activities, and individual counseling all contribute to the development of the whole child, and are accordingly both basic and essential. The school in meeting its responsibilities to the children and to society provides opportunities for the development of understandings, skills, and attitudes in the following areas of human experience: health, consumer activities, intercultural relations, family life, education for leisure, citizenship, global relationships, conservation, and education for aesthetic and spiritual values.

11. The curriculum of the Dallas Independent School District

Through vocational, academic, industrial, commercial, and cultural training, the Dallas Independent School District has established a program that provides for the different groups composing its student body, varying in intelligence, in ability, in vigor, in physical condition, in race, in creed, in economic status, in expectation, but united in the democratic ideal.

12. Co-curricular activities

The school provides those co-curricular activities which promote pupil growth by affording opportunities for the development of character, personality, creative ability, social grace, and wholesome interests. These activities broaden and enrich learning experiences; but probably their greatest benefits are found in the enrichment of the pupil's character, personality, and creative ability. They have also a large social value, that of giving the pupil poise and effectiveness in the group. A definite integration of these co-curricular activities

with the general school program greatly enhances their value both to the student and to the school.

13. Guidance

Guidance, the articulate adjustment of the individual to probable life experiences, embodies the principles of safe and sane living. Specific functions are these: to give the individual the help he needs for self-discovery, for the integration of personality and character, for understanding those about him, for understanding the world of work about him and his place in it.

14. Inculcating an accepted political philosophy

Most Americans consider any semblance of indoctrination repugnant; nevertheless, this considered statement is made: The American school has a definite responsibility in maintaining and inculcating a political philosophy favorable to our democratic institutions and to our way of life. This responsibility emanates from a consideration of the school as an agency of the state, an agency whose purpose it is to assist the individual in attaining his highest development. The state exists by virtue of adherence to certain basic principles and institutions, which must be upheld by the school; otherwise, our democratic society, as we know it, cannot survive. The American school cannot escape its duty to inculcate in its pupils these accepted basic democratic principles; dignity of the human spirit, freedom, liberty, pursuit of happiness, equality of opportunity, and constitutional government. The school in a democracy teaches that the individual has responsibilities as well as rights, that the accepted American policy is the constant striving for the democratic ideal. The school sedulously avoids any attempt to prejudice against any individual, class, political party, race, or creed; it also avoids sedulously any effort to indoctrinate for any individual or group.

15. Health of pupil

The school provides for the pupil the following essentials: a healthful physical environment; a program of play, physical exercises, and

instruction in the fundamental rules of health and personal hygiene; a testing and follow-up program; means of caring for the physically handicapped; appropriate forms of athletics and recreation; an effective school lunch program. The school also provides psychological and psychiatric aid in nurturing the mental health of the pupils. When the family income cannot meet the expense involved, the child having a remediable physical or mental defect is brought to the attention of the proper social agency that will, with the parents' consent, provide the medical care needed.

16. School personnel--pupil

The pupil is a part of the school during childhood, adolescence, and youth. In these years he develops physically, mentally, and spiritually. The school furnishes the best possible opportunity for this development; it exists for the pupil. In school the pupil assimilates knowledge; grows in stature and in spirit; acquires skills, habits, attitudes, and ideals. The pupil is the most important member of the school personnel

17. Qualifications for teaching

In no other profession should the qualifications for service exceed those required of the teacher. As employed here, the word teacher includes every person in the school system who is in any way responsible for the education of children. Summarized briefly, the chief requirements for teaching are these: (1) thorough academic training to assure competence in a specified field; desire to continue study--to broaden mind, heart, and spirit; (2) genuine love of children: profound understanding of their problems and sincere interest in the solution of these problems; (3) depth of character; high moral and mental integrity, genuine kindness, true courage, sane social standards; (4) good health: physical, mental, and spiritual vigor; (5) well-integrated personality; (6) sincere desire to participate in worthwhile community programs.

18. Educational experiences found in the community outside of school

Correlation of community life with school experiences includes a sensible utilization of community assets. The experiences offered by the community are integrated by the school so that each depends upon the other and supplements it. A practical knowledge and thorough understanding of the purpose and function of such experiences result, since experiences gained outside school furnish the richest subjects for expression within school. For example, an economics class will get an enlarged understanding of commerce through visits to a bank.

19. Arousing the community to a sense of the importance of education

The school has the definite and dual responsibility of (1) arousing the community to a sense of the importance of education and (2) acquainting it with what the school is doing to "lift its sights" to make its vision broad, and sharp, and steady enough to reach the high mark so confidently set by the community and so ardently desired by all. Some of the means which the school employs in fulfilling this responsibility are these: happy pupils in the classroom, live parent-teacher associations and dads' clubs, newspapers and radio, visitation, addresses of administrative personnel before civic organizations, publications, community programs and projects, films and posters, non-professional magazine articles, teacher organizations, membership of school people in organizations functioning socially in the community. The most effective of these means is the happy pupil, who not only tells his parents of the school life, but also carries into manhood a conviction of the importance of education in developing useful, and happy, and successful citizens for the community of the future (5, pp., 7-20).

The monograph entitled Plan of Action (5) presented the philosophy of the Dallas Independent School District during the school year of 1947-1948. In the year of 1950 the teachers and administrators of the Dallas Independent School District

again combined their efforts. These combined efforts resulted in a statement of how the teachers and administrators might affect the educational beliefs set forth in the Plan of Action (5).

A publication entitled The Curriculum in Action (6) was prepared for use during the period of curriculum revision and development. This publication provided direction for the study of the entire curriculum so the study could move consistently and progressively through the various plateaus of instructional improvement until the desired goal could be achieved. The perpetuating ideas set forth in The Curriculum in Action (6) are as follows:

Definition of Broad Fields Curriculum

The broad fields curriculum is an organizational plan which fuses similar subjects into large areas in which each subject loses its identity and becomes an integral part of the whole area. All of the living experiences of children along with subject matter are organized into a few large areas which usually include language arts, social studies, arithmetic, science, and creative recreative arts.

The Concept of Broad Fields Curriculum in Action

"The child's growth is the core of our philosophy." This governing tenet was set forth in Plan of Action. A Statement of Philosophy, Dallas Independent School District, 1947. In accordance with this fundamental principle, the broad fields curriculum plan for the schools of Dallas is based on considerations pertinent to caring for the growth needs of children. It is believed that this organizational plan allows opportunity for the teacher to provide optimum growth experiences for children, to confront them with developmental problem situations, and to help them arrive at the sense of values necessary to a democratic society. While

affording opportunity for functional procedures in academic pursuits, the plan likewise encourages the flexibility desired by the teacher in her efforts to guide learning experiences toward the end of developing in each child an integrated personality (6, p. 9).

The core of the philosophy for the Dallas Independent School District is the child's growth. This philosophy of the child's growth is in agreement with the objectives of its broad field curriculum. It is believed that a curriculum, such as the broad field curriculum, provides the opportunity for optimum growth experiences for children in life situations and helps develop a sense of values necessary to a democratic society.

The operation of an organized program of education must be based upon a philosophy. In addition to a philosophy, the administrators must formulate policies by which the program will function.

The field trip is one of the accepted methods of acquainting students with the operations involved in the everyday activities of the community. In using the field trip, the student is offered an opportunity to observe the activities of the community from actual experience. This type of experience should be the climax of an area of study; however, the climax does not necessarily indicate the completion of an area of study. The field trip should be taken after a reasonable amount of study has been given to an area and undertaken at the most opportune time. The field trip should

be followed by a comprehensive discussion with questions that were asked before and during the visit.

The administration of the Dallas Independent School District has established policies for the efficient operation of the educational program. The policy governing field trips is as follows:

Field Trips

The policies set out below were developed by a committee appointed to study the value of field trips and to make plans for their administration. Following each trip the teacher in charge will make a written report in duplicate to the principal, one copy of which will be forwarded to the Assistant Superintendent in Charge of Special Services with the principal's evaluation. Principals and teachers are responsible for arranging for transportation of their pupils on a field trip and will refrain from accepting transportation of the industries being visited. In addition to a narrative description of the activity, the report will contain this information:

1. Number and grade of children
2. Means of transportation
3. Hour of leaving school building and hour of return; total time away from building
4. Accidents or mishaps
5. Evaluation of project by teacher and principal
6. Recommendation regarding modification or change of policy (if desired).

Field trips are confined to the boundaries of the Dallas Independent School District. Absence from building must not exceed ninety minutes,

Definition. A field trip is recognized as an extension of the experiences of a group, such experiences taking place outside the classroom; for example, visits to industrial plants, museums, and governmental buildings. It should be emphasized that a field trip should be viewed as a functional

part of the whole teaching experience. A field trip is not designed to serve advertisers or public relations interest.

Origin. The need for a field trip should develop in an instructional situation, and not in response to a public relations department of a business or industry.

Purpose. A field trip should:

1. Provide valuable experiences that are needed by the pupil and are not available in the classroom.
2. Tie in life of the community with classroom experiences
3. Serve as a means of stimulating and developing powers of observation and discrimination in the pupil
4. Serve to arouse interest in an educational experience or serve as a climax to it.

Planning. Teacher Planning. The teacher should:

1. Field trips cannot be out of the city limits
2. Visit the place for which the field trip has been arranged
3. Prepare the pupils to look for specific items
4. Use school time in such a way that the greatest values may be derived in proportion to the time expended
5. Plan a field trip that will not exceed one and one-half hours of school time
6. Plan not more than two field trips in any one term
7. Obtain written approval from parents prior to making the field trip, with approval forms being kept on file in the school for a period of sixty days thereafter
8. Plan with principal in advance of the contemplated trip.

Teacher-Pupil Planning. The pupils, under supervision, should:

1. Set up committees to make appointments, arrange for transportation, and attend to other details
2. List relevant questions prior to the trip, and questions for the trip to answer

3. Discuss in class the potential value of the trip in preparation for it.

Evaluation. Upon the completion of the field trip the results should be thoughtfully analyzed by a follow-through procedure conducted in the classroom. The teacher and pupils should weigh the results attained to ascertain their relative importance. The pupils should freely express themselves, suggesting means of improving procedures for the next field trip to the same place. (Suggested means for improving procedures for the next field trip to the same place become an organic part of the teaching procedure.)

1. They become an organic part of the teaching procedure.
2. They provide opportunities for observation of community enterprises, developing in the pupils powers of observation and discrimination.
3. They are carefully planned by the teacher, pupil, principal, director and parent.
4. They are thoroughly reviewed by pupils and teachers after their conclusion.
5. Bonded transportation is available and arranged for the school, not by the business or industry being visited (1, pp. 50-52).

To summarize briefly, the policy governing field trips defines a field trip, its origin, purpose, planning, and evaluation. These policies emphasize that the teacher and the students should be prepared to analyze the values received from the trip.

The over-all philosophy for the educational program in the Dallas Independent School District has been presented in order to show the relationship of the industrial arts program to the total program. The industrial arts program has been defined as follows:

. . . Industrial Arts is a part of the general educational program that tends to develop within

the individual an interest in industry and an understanding of industrial processes. Through the study of tools and materials and the production of useful and significant products, the student advances in co-ordination of hand and mind. This phase of education gives the student an appreciation of consumer problems and needs and an insight which will aid him in becoming a successful citizen in a democratic society (4, p. 5).

This definition of industrial arts for the local program is similar to the definition in the bulletin entitled, Industrial Arts in Texas Schools (3, p. 1). The objectives for industrial arts in Dallas Independent School District are synonymous with the list of suggested objectives in the aforementioned publication.

The curriculum in the industrial arts program includes the following areas of study:

- Elementary Exploratory Shop
- Exploratory Mechanical Drawing
- Exploratory Metal
- Exploratory Wood
- Exploratory Electricity
- General Mechanical Drawing
- Architectural Drawing
- Technical Drawing
- Unit General Wood
- Unit General Metal
- Unit General Electricity

These areas are general in nature and provide the students

an opportunity to make selection. For example, the area of technical drawing includes machine drawing, drawing involving steel fabrications, topographic drafting, electrical drafting, aircraft drafting, patent drafting, drafting involving pipes and fittings, cabinet and furniture design, charts and graphs, and reproduction techniques. Students are allowed a choice for extra concentration in the fourth year of drawing.

This chapter has presented the philosophy of Dallas Independent School District policies governing field trips, and information concerning the industrial arts program. The guiding philosophy of the school may be stated as follows:
"The child's growth is the core of our philosophy."

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CHAPTER IV
TYPES OF LOCAL INDUSTRIAL RESOURCES LOCATED
IN DALLAS, TEXAS

Cities, just as individuals, are products of their environment and of their heredity. The static geographic endowments may partly explain the basis for a city's location and function. More than a pragmatic analysis of the local economic factors is required to understand the character and function of a city and to estimate its future development. The process of creating an active city from any environment can be accomplished only through creative effort which utilizes local advantages in relation to the social and economic needs.

Dallas was founded in 1841 by John Neely Bryan. Dallas County was created from Robertson and Nacodoches counties and organized in 1846. The city was voted to be the county seat of Dallas County in 1850. The city and county were named for George Mifflin Dallas, the Vice-President of the United States during the administration of President James Knox Polk. From this beginning, Dallas has evolved into the Southwest's main jobbing, wholesale, retail, commercial, and financial center and is also one of the nation's ranking insurance, fashion and governmental office centers (6, pp. 457-8).

The manufacturing industries located in Dallas include the following types:

. . . aircraft, airmotive equipment, textiles and clothing, flour, bakery, meat and food products; chemicals, metals and machine shop products; cotton gin machinery and cotton cleaning equipment; oil well and mining machinery; heating and refrigerating machinery; Portland cement and concrete products, wood working, builders' materials, leather goods. Large printing and publishing business. City noted for medical, engineering, advertising and other professional services (6, p. 626).

The variety of types of local manufacturing industries verifies the position of Dallas as a dynamic metropolitan area and is a factor of cardinal importance to the economy of the State of Texas. Dallas, Texas, is considered as the strategic geographic center of the Dallas-Southwest Region which includes Texas, Oklahoma, Arkansas, Louisiana, New Mexico, Mississippi, and twenty-six counties in Western Tennessee (1). The economic transformation of this region from a predominantly agricultural area to an important mineral producing region in the nation sets forth the implications of the change for Dallas.

Firms located in Metropolitan Dallas manufacturing various products increased the value added by manufacture, by 289 per cent between the censuses in the years 1939 and 1947, and by June of the year 1955, manufacturers were adding value to products at an estimated rate of over \$750,000,000 annually (5, p. 8). These firms now have an estimated 80,000 employees or approximately three times as many as employed

in the year of 1940 (5, p. 8). There are more manufacturing firms producing a greater variety of products in Dallas, Texas, than in any other city of the Southwest, and the 1,758 local Dallas manufacturers are responsible for 14 per cent of all the manufacturing in the State (5, p. 8).

Many leading manufacturers who distribute their products on a nationwide basis make their home in Dallas, Texas. Other manufacturers, recognizing the growing importance of the Southwest as a national regional market, have come to Dallas with new manufacturing plants or distribution warehouses in order to provide for a more adequate distribution and servicing of their products in this area.

The function of Dallas as a regional center may be partly explained in the terms of geographic and economic determinism; yet the reasons for the effectiveness with which the city can fill the role of a major regional center may be traced to a number of local factors. The pattern of development of the city and county presents the physical setting for a modern metropolitan area. The physical setting for Dallas was described in the publication entitled, An Economy Survey of Dallas County, Texas, as follows:

The physical environment of the city and county has facilitated the development of the economic base of the area to the extent that there have been few objective limitations to physical growth. The striking pattern of urban development in the county is apparent Radiating from the central city is a network of highways and railroads, and at the periphery are a number of satellite towns--Grand

Prairie to the west, Carrollton to the northwest, Richardson to the north, Garland to the northeast, Mesquite to the east, and Lancaster to the south. There has thus developed a modern type of metropolitan area with a dispersed urban pattern that frees it from any of the inefficiencies of a monolithic urban center. Dispersion is increasingly characteristic of both industrial and residential development, and the present pattern in Dallas County is in keeping with the modern thinking and requirements. Yet, at the same time, the county remains essentially an organically homogeneous economic unit, closely knit by its excellent highway and railroad network. As a specific location for economic activity, the area thus offers many commanding advantages for new industries and other commercial enterprises, by virtue of its geographic pattern of development.

That the situation will persist in the future is inferred from a recent report of the Dallas Business Executives' Research Committee, Metropolitan Growth and Its Effects on Dallas. It is conceivable that future expansion of the central city will be confined within the natural drainage area tributary to existing streams and creeks within the present city limits. The expediency of limiting to this territory rests upon the fact that gravity sewage flow can be maintained, and development as a compact municipal entity is consistent with the needs for providing effective municipal services of all types (3, pp. 68-70).

The transportation facilities servicing this area offer a variety of modern transportation media. The Dallas area is served by fifty motor freight lines, nine mainline railroads, seven scheduled airlines, and twelve bus lines.

This area has registered a striking increase in manufacturing employment in recent years. "The development of the employment base in many respects is the most significant trend occurring in the county's economic pattern in recent years" (4, p. 77). The registered increases for

the total manufacturing employment may be noted in the 26,700 (2) employees recorded for the year of 1940 as compared to 83,190 (8, p. 1) estimated employees for the first six months of 1956.

Table I presents a listing of the employment population for the major industries located in Dallas County for years 1940, 1950, and 1954. As indicated by the data in Table I, the population employed in manufacturing increased from 26,700 in 1940 to 75,300 employees in 1954. This number of employees, however, rose to a total of 83,190 during the first six months of 1956 (8).

The influences established by the population employed in industry may best be presented in relation to the total population. The characteristics of a population envisages the final potential of influence exertion. Data concerning the population characteristics of the City of Dallas, Dallas County, and the nation are presented in Table II. The total employment for Dallas was 199,747 in 1950. During the same period the employment population for manufacturing firms in the city was 55,215 or approximately one fourth of the total employment population. Dallas craftsmen and kindred workers registered a gain of 92 per cent while the gain for the nation as a whole was only 50.9 per cent. Another significant characteristic of the Dallas population is that 50.7 per cent of the population is in the school age group. The ages

TABLE I
EMPLOYMENT BY MAJOR INDUSTRIES IN DALLAS COUNTY

Total Manufacturing	Number of Employees		
	April 1940	July 1950	May 1954
Foods and Kindred Products	4,944	9,965	10,595
Textile Mill Products	1,362	1,290	1,085
Apparel and other Fin- ished Products	4,266	7,850	7,340
Lumber and Wood Products	324	930	810
Furniture and Fixtures	1,334	2,365	3,015
Paper and Allied Products	894	1,675	2,100
Printing and Publishing	3,246	4,675	5,435
Chemical and Allied Products	1,046	2,075	2,375
Products of Petroleum and Coal	1,622	2,290	2,165
Rubber Products	138	240	310
Leather and Leather Products	215	230	260
Stone, Clay and Glass Products	906	1,375	1,255
Primary Metal Products	378	745	820
Fabricated Metal Products	960	3,125	3,430
Machinery (except electrical)	1,753	4,275	5,240
Electrical Machinery	600	1,000	4,160
Transportation Equipment	1,650	9,500	23,060
Aircraft	0	*	19,650
All Others	1,650	*	3,410
Professional and Scientific Goods	280	390	685
Miscellaneous Manufacturing	774	950	1,160
Total	26,700	55,215	75,300

*Information not available.

of this group range from five to twenty-four years (1). This group is the segment of the population upon which the educational effect of the society is most predominant. A tremendous increase in the employment of professional, technical, and kindred workers for this area is evident as shown by the data presented in Table II. During the ten-year period between the 1940 and 1950 censuses, the employment of professional, technical, and kindred workers has increased 108.5 per cent, while the increase in employment for the same area in the United States was only 37.5 per cent.

The recent trends registered by local industry were pointed out in a recent report published in the Dallas Times Herald, August 5, 1956.

The Dallas Metropolitan area experienced one of the "best first half of the year" periods in its history between January and June with an increase of 14,310 workers compared with the same period last year, a Chamber of Commerce report reveals.

Total employment in the area is now at an all-time high with 332,550 workers.

Most of the increase was in factory employment which is now at a peak level of 83,190 jobs. During the period there were 5,220 new factory jobs created. This accounts for thirty-six and five-tenths per cent of the total increase.

By comparison, factory employment increased by only 1,695 workers between June, 1954, and June, 1955.

A highlight of the report showed that despite some losses from last year, Dallas ranks fourth in the nation in building permits issued during the year.

TABLE II
CHARACTERISTICS OF THE POPULATION OF DALLAS, DALLAS
COUNTY, AND THE UNITED STATES--1950 CENSUS

Characteristics	City of Dallas	Dallas County	United States
Per cent increase over 1940 census	47.4	54.3	14.5
Per cent of population 5 to 24 years of age who are enrolled in school	50.7	52.8	60.6
Total population	434,462	614,799	150,697,391
Per cent increase in total employment since 1940	59.3	65.6	25.3
Increase employment of professional, tech- nical, and kindred workers since 1940	108.5	108.2	37.4
Increase in employment of craftsmen and kindred workers since 1940	92.0	117.2	50.9
Total employment population	199,974	268,092	56,225,340 (1)

Including the island cities, the total in Dallas amounted to \$84,911,456. This compares with Houston's total of \$81,184,041.

Exclusive of the island cities the building permit total in Dallas amounted to \$81,085,735.

Gains were recorded in the non-residential building classification. Total construction awards in the area increased from \$136,808,000 to \$146,763,000 compared with the first six months of last year.

Consumption of electricity went up thirteen and one-tenth per cent, pounds of air mail originating here increased fourteen per cent and consumption of natural gas jumped twelve and five-tenths per cent.

Non-residential building contract awards were on the minus side during the period. New car registrations were down sharply from the record sales of 1955 in keeping with a national trend.

A noticeable drop was recorded in the number of new businesses opened, but this was more than offset by the expansion of existing businesses.

The number of new businesses started this year amounted to 450. This compares with 619 new firms opened during the first half of last year (8, part C, p. 7).

The aforementioned data present a comprehensive report of the activity in the City of Dallas for the first six months in the year of 1955. Increases are indicated in almost all areas mentioned; however, a drop in the establishment of new businesses was noted. The drop in numbers of new business firms was offset by expansion of the existing business firms and was registered as a gain by the report.

The types of industries contracted during this study appear in Table III. The data presented in Table III offer an opportunity of comparing the potential of local industrial resources in selected areas of manufacturing. All companies in the selected areas of study listed in the 1956 Key to

TABLE III
INDUSTRIAL FIRMS LOCATED IN DALLAS, TEXAS

Industries	Number of Firms Listed in the <u>Key to Buying in</u> <u>in Dallas, 1956</u>	Number of Firms Listed in the <u>Greater</u> <u>Dallas Areas Tele-</u> <u>phone Directory, No-</u> <u>vember, 1955 (3)</u>
Foundries	10	26
Foundry Equipment and Supplies	0	3
Welding	6	58
Welding Equipment and Supplies	8	23
Sheet Metal Products	10	87
Sheet Metal Equipment	2	3
Machine Shops	9	93
Metal Working Machinery	4	30
Iron Ornamental	16	37
Steel Fabricated	9	31
Store Fixtures	7	16
Furniture	19	34
Wood Products	2	0
Woodworking	2	6
Woodworking Architectural	1	1
Electrical Equip- ment and Supplies	6	82
Electro Mechanical	1	0
Electronic Equip- ment	6	15
Electronics	3	0
Electroplating	8	25
Paint, Varnish and Wood Finishes	22	44

Buying in Dallas were polled; however, these do not represent the total number operating in the area. Six companies engaged in the welding industries were contacted; however,

fifty-eight such companies were at the time operating in the Metropolitan Dallas Area. In another area of local manufacturing, less than 10 per cent of the available firms were polled; this was the area of manufacturers involving machine shop products. Only nine of the ninety-three machine shop firms and 11 per cent of the sheet metal manufacturing firms were polled.

Similar percentages were registered for the furniture and paint, varnish, and wood finishes industries. Fifty-five per cent of the furniture manufacturing firms and twenty-two of a total of forty-four paint, varnish and wood finishes manufacturers were interviewed.

A brief history of Dallas, Texas, and background of industry has been presented in this chapter as well as the function of Dallas, Texas, as a regional center of the Southwest. Data concerning types of local industrial resources located in Dallas were also presented. Special emphasis was placed on employment by industries, characteristics of the population in Dallas County as compared with the United States.

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CHAPTER V

THE AVAILABILITY OF LOCAL INDUSTRIAL RESOURCES FOR USE IN THE INDUSTRIAL ARTS PROGRAM

After establishing reasons for the use of local community resources for instructional enrichment of the industrial arts program and presenting data indicating the relative importance of industry to Dallas society, the serviceable aspects of that industrial society to the industrial arts program should be defined. These serviceable aspects of local industry are the human and material resources available for instructional enrichment of the industrial arts program in the Dallas Independent School District.

The responses of the management of the industries polled during the study include responses from managers, men in charge of public relations, vice-presidents, district managers, and owners. The data presented in Table IV represent the responses of executives of 130 industries. These data are divided into four major categories and are as follows: seventy-one representing metal industries, twenty-seven wood industries, sixteen electrical and electronic industries, and sixteen paint, varnish and wood-finishing industries.

A substantial majority of the executives interviewed conveyed a welcome to industrial arts teachers and students.

TABLE IV

RESPONSES RECEIVED FROM 130 COMPANIES ENGAGED IN MANUFACTURING
IN DALLAS, TEXAS, CONCERNING THEIR AVAILABILITY AS LOCAL
INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	106	24
2. Would your firm permit industrial arts teachers to tour your plant?	113	17
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	28	102
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	74	56
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	79	51
6. Would your firm place sample products in the industrial arts classrooms?	35	95
7. Does your firm have literature concerning your product and manufacturing processes?	38	92
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	37	93
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	32	98

Industrial arts teachers, however, are welcome in seven firms where students are not, and in seventeen firms the possibility of any visitation is negative according to responses received.

Affirmative replies were received to approximately one-fourth of the questions involving the use of sample products in the industrial arts classrooms or showrooms and literature that could be made available for use in industrial arts in the Dallas Independent School District. Approximately 25 per cent of the firms have other types of aids available. Some of the aids and information listed by the executives interviewed are as follows: movies and film-strips depicting manufacturing processes and product usage, operational charts for machines and equipment, machine nomenclature charts, and structural information concerning product construction.

Twenty-eight affirmative replies were received concerning assistance in arranging and conducting seminars for the industrial arts teachers. These replies represented firms from all four of the major categories of industrial firms.

The Metal Industries

The metal industries constitute an important segment of the economy and society of our nation. Their influences may be traced to each American citizen in his average daily routine of living. The many materials, safety devices, tools, and equipment made possible through the intelligent utilization

of the engineering knowledge and products of the metal industries provide for the many comforts and conveniences we enjoy in our everyday pursuit of living.

To foster an understanding and appreciation of the aspects of the metal industries, the industrial arts program includes the study of these industries. A study of these industries involves myriad tools, materials, processes, and problems relating to these industries. Table V presents data concerning the responses received from the management of seventy-one local metal industries. A large percentage of the managers, owners, and men in charge of public relations indicated that visitation of their industries by industrial arts teachers and students would be welcomed. Less than one-third of the responses were affirmative to the questions concerning assistance in conducting seminars for teachers, placing sample products in the industrial arts classrooms, and the availability of literature concerning products and processes.

The data presented in Table V represent only a part of the metal industries located in Dallas, Texas. The industries are as follows: foundries, welding works, welding supplies and equipment companies, sheet metal equipment firms, machine shops, metal working machinery firms, ornamental iron manufacturers, and steel fabricators.

The foundry is probably the foundation of the metal industries because the industry utilizes the primary metals.

TABLE V

RESPONSES RECEIVED FROM SEVENTY-ONE COMPANIES ENGAGED IN THE
METAL WORKING INDUSTRIES CONCERNING THEIR AVAILABILITY
AS LOCAL INDUSTRIAL RESOURCES FOR USE
IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	58	13
2. Would your firm permit industrial arts teachers to tour your plant?	65	6
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	20	51
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	41	30
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	42	29
6. Would your firm place sample products in the industrial arts classrooms?	21	50
7. Does your firm have literature concerning your product and manufacturing processes?	22	49
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	22	49
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	20	51

The use of metal has its beginning with the extraction of the primary metal from the native ore. This separation occurs when the metal is in the molten state in which it is used in the foundries. The data presented in Table VI indicate that the ten companies polled in this study have little literature that would be available concerning their products and manufacturing processes. The companies which do have literature indicated the literature would be available to the students enrolled in industrial arts classes. The management of more than 90 per cent of the firms contacted indicated that visits by industrial arts teachers and students to their plants would be welcomed. Over 50 per cent of the management of the companies indicated company policies would allow some of the employees to give limited assistance to the regular industrial arts classes and to industrial arts teachers concerning the company's products and processes in the form of demonstrations and talks.

Responses received from the managers of the ten foundries who were contacted revealed that other aids would be available in the form of instructional materials. The additional materials consisted of the following: patterns, drawings, match plates, and some castings. It was indicated by the managers, however, that most of the patterns were the property of the person or persons for whom the castings were made. Companies engaged in foundry equipment and supplies were not

TABLE VI

RESPONSES RECEIVED FROM THE COMPANIES ENGAGED IN FOUNDRY WORK
CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	9	1
2. Would your firm permit industrial arts teachers to tour your plant?	10	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	6	4
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	5	5
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	6	4
6. Would your firm place sample products in the industrial arts classrooms?	8	2
7. Does your firm have literature concerning your product and manufacturing processes?	2	8
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	2	8
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	3	7

polled because firms engaged in the handling of such equipment and supplies were not listed in the source from which the listings of companies were obtained for this study.

Three foundry equipment and supply companies were listed, however, in the Greater Dallas Area Telephone Directory (10).

Table VII contains data concerning five of the welding companies that were polled. In tabulating the responses received from the management representing the five companies, it was noted that not all of the manufacturers believed they would be able to be of assistance as resource people in the same areas. The manager of one company indicated sample products could be made available to the industrial arts classrooms, while another reported he would allow some of his employees to assist in the industrial arts programs or to assist the industrial arts teachers outside of regular classes. Literature explaining the processes used in welding and the manufacturing of products appeared to be available from any of the firms polled.

As shown by the data presented in Table VII, the welding companies that were contacted would welcome visitation by industrial arts students and teachers. The responses of the management of the five companies indicated that the possibility of using the facilities and some of their employees of their companies in other ways to enrich industrial arts was not favorable. This is evidenced by the fact that all

TABLE VII

RESPONSES RECEIVED FROM FIVE COMPANIES ENGAGED IN WELDING
WORK CONCERNING THEIR AVAILABILITY AS LOCAL INDUS-
TRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	5	0
2. Would your firm permit industrial arts teachers to tour your plant?	5	0
3. Would your firm assist in arranging for and conducting a seminar for industrial arts teachers?	0	5
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	1	4
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	1	4
6. Would your firm place sample products in the industrial arts classrooms?	1	4
7. Does your firm have literature concerning your product and manufacturing processes?	0	5
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District	0	5
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	0	5

of the managers doubted that assistance in conducting seminars would be possible and that instructional aids were not available.

The welding supply and equipment companies apparently have an abundant supply of industrial resource material. This abundance of material is acquired by these firms from a number of sources. Each manufacturer of welding equipment and supplies provides literature about each product. This literature is presented in various forms, such as charts, brochures, and other similar forms. These companies also have factory representatives to aid in the installation and operation of their equipment. The companies manufacturing welding supplies, such as welding rods and flux, have employees who are available for demonstrations at almost any time and place. The data concerning the companies dealing in welding equipment and supplies are presented in Table VIII.

The managers of the eight welding equipment and supply companies indicated their firms would assist industrial arts teachers outside of regular classes. They also volunteered their services for discussions and demonstrations in the industrial arts classes. All eight of the managers reported their firms could not place sample products in the industrial arts classrooms because the manufacturers of the equipment had company policies prohibiting the installation of sample equipment. Three managers indicated they would not permit

TABLE VIII

RESPONSES RECEIVED FROM EIGHT WELDING EQUIPMENT AND SUPPLY COMPANIES CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	5	3
2. Would your firm permit industrial arts teachers to tour your plant?	7	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	4	4
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	8	0
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	8	0
6. Would your firm place sample products in the industrial arts classrooms?	0	8
7. Does your firm have literature concerning your product and manufacturing processes?	7	1
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	7	1
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	7	1

industrial arts classes to visit their firms, and one manager indicated that visitation by industrial arts teachers would not be welcomed.

The managerial responses received from nine companies engaged in sheet metal products are presented in Table IX. The owner of one of the companies stated his company had an apprenticeship program (7). All employees who begin their careers as sheet metal workers in this particular company must attend a training program which spans a six weeks' period of time. The manager of another firm stated that he was chairman of the board for the Apprenticeship Training School (8). This training program for apprentices has been conducted for sometime and is sponsored by the local union for sheet metal workers. Classes for this apprenticeship training program are held two evenings each week at N. R. Crozier Technical High School, Dallas, Texas, during the school year. This manager stated that a meeting of the apprenticeship training board would be held before the end of the month of August in order to formulate the plans for the coming year. This program was scheduled to begin during the first or second week of the 1956-1957 Dallas Public School Year (7).

The majority of the managers of firms engaged in sheet metal work indicated their companies would welcome visits by the industrial arts teaching staff and their students. As indicated by the data in Table IX, one company would not

TABLE IX

RESPONSES RECEIVED FROM NINE COMPANIES ENGAGED IN SHEET METAL
WORK CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	8	1
2. Would your firm permit industrial arts teachers to tour your plant?	8	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	3	6
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	6	3
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	5	4
6. Would your firm place sample products in the industrial arts classrooms?	3	6
7. Does your firm have literature concerning your product and manufacturing processes?	1	8
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	1	8
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	8

allow visitation by either industrial arts teachers or students. Three of the firms contacted showed an interest in the idea of conducting a seminar for the local industrial arts teaching staff. The managers of the firms were of the opinion that placing of sample products in the industrial arts classrooms would be somewhat of a problem because the products manufactured by the majority of the firms are of large size; however, one company would be able to furnish some instructional aids. The aids that could be furnished would be scaled models of the products showing many of the processes and problems that confront the sheet metal industries. A scarcity of available literature involving the products and manufacturing processes was noted by the number of companies replying "No" to question number seven in Table IX: "Does your firm have literature concerning your product and manufacturing processes?"

The two sheet metal equipment companies contacted apparently possess a number of available resources as indicated by the data in Table X. The managerial response to the questionnaire was affirmative. The manager of one company reported that the manufacturer represented by his company had a policy of not providing equipment to be installed or used as samples. This manager indicated that in order to use equipment as a sample, his company would need to establish a policy to provide for such services. The men representing

TABLE X

RESPONSES RECEIVED FROM TWO SHEET METAL EQUIPMENT COMPANIES
CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	2	0
2. Would your firm permit industrial arts teachers to tour your plant?	2	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	2	0
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each month?	2	0
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	2	0
6. Would your firm place sample products in the industrial arts classrooms?	1	1
7. Does your firm have literature concerning your product and manufacturing processes?	2	0
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	2	0
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	2	0

the companies polled indicated the literature that was available was provided by the manufacturers of the equipment and the literature in their possession was concerned with the operation of the various pieces of equipment built by the manufacturers.

The data in Table XI are the responses received from nine machine shop executives indicating the availability of their firms as a source of instructional aid. The three machine shop managers who gave a negative reply to the question concerning visitation commented that their firms were engaged in manufacturing products restricted by the United States Government and a visit made to a firm engaged in such manufacturing must be cleared by obtaining governmental permission or clearance. The three managers did suggest that permission for a visit might be obtained, but the information secured during a visit could not be as complete as it would be if the visitors were allowed to study the drawings of the product before the actual machining operations were observed. The person in charge of public relations of one firm favored the idea of conducting a seminar for the industrial arts teachers while the responses received from the other eight companies were negative.

All answers concerning the availability of literature describing the various manufacturing processes were negative. The chief engineer of one of the nine firms indicated his firm could provide other types of aids for the use of

TABLE XI

RESPONSES RECEIVED FROM NINE COMPANIES ENGAGED IN MACHINE SHOP WORK CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	6	3
2. Would your firm permit industrial arts teachers to tour your plant?	6	3
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	1	8
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	4	5
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	4	5
6. Would your firm place sample products in the industrial arts classrooms?	1	8
7. Does your firm have literature concerning your product and manufacturing processes?	0	9
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	9
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	8

industrial arts classes. He was of the opinion the aids could be used as examples of the machining operations involved in the manufacture of his company's products.

The men in charge of public relations for four metal machine and equipment companies indicated that visitation by the industrial arts students and teachers would be welcomed. These men did add, however, that the information available from their companies would be concerned with the operation and maintenance of the specific equipment which their companies sell. This information in the form of literature emphasizes the features peculiar to each of the different products and machines.

Three of these companies have other aids available for use in industrial arts classrooms. The aids listed by each manager are as follows: movies available from the equipment manufacturers, film strips depicting the various operations performed by the equipment, nomenclature diagrams for each machine, charts indicating the recommended cutting speeds for the various materials used with the machines and the material capacities for each type of material processed by the machines. Table XII presents data concerning the responses received from the management of the four machine and equipment companies.

Seventy-five per cent of the managers of the machine and equipment companies polled indicated that employees

TABLE XII

RESPONSES RECEIVED FROM FOUR METAL MACHINE AND EQUIPMENT
COMPANIES CONCERNING THEIR AVAILABILITY AS LOCAL IN-
DUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	4	0
2. Would your firm permit industrial arts teachers to tour your plant?	4	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	1	3
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	3	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	4	0
6. Would your firm place sample products in the industrial arts classrooms?	1	3
7. Does your firm have literature concerning your product and manufacturing processes?	4	0
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	4	0
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	3	1

would be allowed to assist in regular industrial arts classes. One manager suggested, however, that his employees would be of little assistance in explaining the machine operations to anyone because their knowledge of the operations consisted only of starting and stopping the machines and equipment.

The local manager of one of the firms which was polled stated his firm would possibly conduct a seminar for the industrial arts teachers. He stated he had recently had a conversation with Bragg Stockton, consultant for Industrial Arts and Vocational Education, Dallas Independent School District, concerning a seminar for the local industrial arts teaching staff. He added the plans for the seminar had not been completed (3).

Sixteen companies engaged in ornamental iron work were polled. The responses received from the executives in the sixteen firms concerning ways in which their companies might be utilized as educational resources are presented in Table XIII. The data indicate a majority of the firms will welcome visits by students and industrial arts teachers, either as class groups or individual tours. Thirty per cent of the managers believed their firms had literature concerning their products and manufacturing processes and reported they would make the literature available to the industrial arts teachers and students in the Dallas Independent School District.

TABLE XIII

RESPONSES RECEIVED FROM SIXTEEN COMPANIES ENGAGED IN ORNAMENTAL
WORK CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour their plant?	12	4
2. Would your firm permit industrial arts teachers to tour your plant?	15	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	2	14
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	8	8
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	6	10
6. Would your firm place sample products in the industrial arts classrooms?	5	11
7. Does your firm have literature concerning your product and manufacturing processes?	5	11
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	5	11
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	15

Fifteen of the managers reported their firms did not have any aids or information that would be useful for instructional purposes in the industrial arts classrooms. The managers of two firms indicated their firms would sponsor a seminar for the teachers in the local industrial arts program. These two managers expressed a desire to be of assistance to the teachers by making available their products and processes to the educational program.

The fabrication of steel is a common sight to the citizens of Dallas, Texas, because of the many commercial and industrial buildings being erected in the city. Several large buildings using fabricated steel for the structural framework have recently been completed in the downtown area, and buildings are under construction in many areas of the city. Steel fabrication has been used in constructing a variety of other projects in the city, such as the north-south expressway and other improved traffic arteries currently under construction. The data presented in Table XIV represent the managerial responses of eight companies engaged in the fabricating of structural steel.

One executive indicated that he would not welcome visits by student groups because the machines and equipment used in his firm were hazardous. The managers of seven companies, however, reported they would be pleased to conduct a tour of their plants for industrial arts students and teachers. The

TABLE XIV

RESPONSES RECEIVED FROM EIGHT COMPANIES ENGAGED IN STEEL FAB-
RICATION WORK CONCERNING THEIR AVAILABILITY AS LOCAL
INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	7	1
2. Would your firm permit industrial arts teachers to tour your plant?	8	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	1	7
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	4	4
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	6	2
6. Would your firm place sample products in the industrial arts classrooms?	1	7
7. Does your firm have literature concerning your product and manufacturing processes?	1	7
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	1	7
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	2	6

absence of literature available for instructional purposes was explained by several of the managers who were interviewed. They reported that the American Institute of Steel Construction provided the available literature used in the steel fabricating industry. The local branch of the American Institute of Steel Construction is located in the city and will offer assistance in several ways. Engineers employed by the institute are available for lectures and consultant services. Some publications may also be obtained from this office for a nominal fee.

Fifty per cent of the managers interviewed indicated their firms would allow employees to assist teachers in the industrial arts classrooms or laboratories. Seventy-five per cent, however, indicated their firms would have an employee available to assist teachers outside of regular classes. The suggested procedure was to have the teacher visit the employee during his regular work hours with the company. This method of acquiring assistance would afford opportunity for the industrial arts teacher to obtain assistance regarding some particular problem and also present the possibility of obtaining some related information that would be useful in the regular class routine.

The Wood Industries

The use of wood has been associated with man throughout the history of his development. The use of wood today ranges

from products made of wood in its natural form, to the use of composite or composition wood products. Processing wood products today parallels the development of other industries.

Wood has served man in many ways. Its structural qualities have for many years added to the protection of man by providing shelter from the natural elements. Wood has provided fuel for heating and food preparation, furniture for comfort, and vehicles for transportation such as sleds, wagons, ships, and even one of our more modern inventions, the airplane. The material has provided a decorative medium for man's dwellings. The study of the wood industries provides a vehicle for the study of artifacts of the past and products of the present and future.

The study of the wood industries by students enrolled in industrial arts classes provides the students with an opportunity for obtaining a better understanding of the problems, processes, and products of these industries. This study could also provide information concerning these industries for use in making a vocational or avocational choice.

The data presented in Table XV represent the responses received from the management of twenty-seven companies engaged in the wood industries. The data show the managers of all the companies would not sponsor a seminar for industrial arts teachers; however, a majority of the managers indicated visitation of the firms by industrial arts teachers would be possible.

TABLE XV

RESPONSES RECEIVED FROM TWENTY-SEVEN COMPANIES ENGAGED IN THE
WOODWORKING INDUSTRIES CONCERNING THEIR AVAILABILITY AS
LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	22	5
2. Would your firm permit industrial arts teachers to tour your plant?	23	4
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	27
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	13	14
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	15	12
6. Would your firm place sample products in the industrial arts classrooms?	2	25
7. Does your firm have literature concerning your product and manufacturing processes?	4	23
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	3	24
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	3	24

Responses received from six manufacturers of store fixtures are presented in Table XVI. These responses indicate full co-operation by these industries concerning the question of industrial arts student and teacher visitation. The managers interviewed for this study indicated they would welcome the opportunity to introduce students to the products and processes relating to their manufacture. The managers indicated their firms would not assist in arranging and conducting a seminar for industrial arts teachers.

When asked if their firms would place sample products in the industrial arts classrooms or showrooms, the managers gave a negative response. Several of the managers reported the products manufactured by their company were manufactured to the specifications of their customers and finished products were not available.

One hundred per cent of the responses received from the managers of the six companies was "No" concerning available literature for use in industrial arts classes. One manager suggested that drawings of typical store fixtures could be obtained from his company. He also mentioned his membership in the National Association of Store Fixture Manufacturers (1).

The managerial responses of the managers of sixteen manufacturers of furniture are recorded in Table XVII, and, as may be noted, there were only three negative responses recorded concerning visitation by industrial arts students

TABLE XVI

RESPONSES RECEIVED FROM SIX COMPANIES ENGAGED IN STORE FIX-
TURE MANUFACTURING CONCERNING THEIR AVAILABILITY AS LOCAL
INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	6	0
2. Would your firm permit industrial arts teachers to tour your plant?	6	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	6
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	4	2
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	4	2
6. Would your firm place sample products in the industrial arts classrooms?	0	6
7. Does your firm have literature concerning your product and manufacturing processes?	0	6
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	6
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	5

and teachers. A majority of the managers indicated that tours sponsored by students would be welcome.

Two managers suggested their firms could place sample products in the industrial arts classrooms and showrooms, but with certain reservations. These reservations were that the industrial arts teachers should be responsible for the sample products and for their transportation to and from the school.

Literature suitable for instructional purposes is not available from the companies except in three cases. Managers of the three companies who have literature available stated the literature consisted mostly of advertising concerning their products. However, some of the printed material does explain the structural characteristics of the products. All of the managers interviewed reported their firms did not have other types of information or aids which would be useful to the teachers of industrial arts. The possibility of having the furniture manufacturers contacted to arrange and conduct a seminar for industrial arts teachers was negative as indicated by the data in Table XVII.

Companies engaged in processing and manufacturing wood products produce a variety of forms. These products may include many of the standard shapes of moulding and siding used in building construction. Products of this type are considered to be stock items for the home building industries. When the necessity arises, products other than stock items

TABLE XVII

RESPONSES RECEIVED FROM SIXTEEN COMPANIES ENGAGED IN FURNITURE MANUFACTURING CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	13	3
2. Would your firm permit industrial arts teachers to tour your plant?	13	3
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	16
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	7	9
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	9	7
6. Would your firm place sample products in the industrial arts classrooms?	2	14
7. Does your firm have literature concerning your product and manufacturing processes?	3	13
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	3	13
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	0	16

may be produced, and if so, the prospective customer provides the information necessary for the processing and construction of the finished article he desires. Information concerning responses of the owners of two such companies is presented in Table XVIII.

The owner of one of the firms contacted indicated his firm had possession of some aids that would be available to the local industrial arts teachers. He believed these aids would be of value in the study of home and building construction, such as charts showing the full size sectional views of standard moulding and siding.

Both companies would permit industrial arts teachers to visit their firms but one declined to extend an invitation to students. Answers to the questions concerning permitting or providing employees to assist in the regular industrial arts classes or having an employee to assist teachers outside of regular classes were divided equally with one "Yes" and one "No."

Differentiation of firms dealing in wood products from firms engaged in woodworking may best be explained by the fact that firms engaged in woodworking do not deal primarily in standard structural materials as do the firms dealing in wood products. The managers of firms engaged in woodworking polled for this study produce a wide variety of products including furniture, fixtures, storage units, and similar items.

TABLE XVIII

RESPONSES RECEIVED FROM TWO COMPANIES ENGAGED IN THE MANUFACTURE OF WOOD PRODUCTS CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	1	1
2. Would your firm permit industrial arts teachers to tour your plant?	2	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	2
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	1	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	1	1
6. Would your firm place sample products in the industrial arts classrooms?	0	2
7. Does your firm have literature concerning your product and manufacturing processes?	1	1
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	2
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	1

These firms cater strictly to customer needs. Table XIX presents data received during personal interviews with the management of two firms engaged in woodworking.

Both managers replied with affirmative answers to the following questions: "Would your firm permit industrial arts students to tour your plant, and would your firm permit industrial arts teachers to visit your plant?" This is indicated in Table XIX. One of the managers reported his firm would permit employee assistance to industrial arts teachers in regular classes and outside of regular classes. This, he believed, would offer the industrial arts students an opportunity for discussing the processes involved in the manufacturing but also would provide the student with possible occupational guidance. The managers believed the supply of qualified employees was very limited and stated his firm would appreciate an opportunity to talk with the students. (2). Immediately before this comment, however, the manager indicated his company would not be interested in arranging a seminar for industrial arts teachers (2).

As in the case of other manufacturers, the two firms engaged in the woodworking industry produce finished items to the customers' specifications. This type of custom work does not provide the manufacturer with a supply of sample items. In response to the question concerning other available aids and information suitable for instructional purposes,

TABLE XIX

RESPONSES RECEIVED FROM TWO COMPANIES ENGAGED IN WOODWORKING
CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	2	0
2. Would your firm permit industrial arts teachers to tour your plant?	2	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	2
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	1	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	1	1
6. Would your firm place sample products in the industrial arts classrooms?	0	2
7. Does your firm have literature concerning your product and manufacturing processes?	0	2
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	2
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	1

the manager of one company indicated that some prints of their products were available. The drawings must be kept on file by the company for future reference.

Table XX presents data concerning the responses of the manager of one firm engaged in architectural woodworking. This firm manufactures special items for home builders. The recorded responses for this company were negative in all respects.

The Electric and Electronic Industries

The phenomenon of electrical energy has from the beginning of man's history presented an awe-inspiring spectacle. The study of electricity and electronics has made rapid advances in recent years, yet the possibilities in this field suggest that electricity is actually in its infancy. Harnessing electrical energy has made many advancements possible, such as providing a source of power, heating and lighting facilities, and, most important, an efficient communications system. The data presented in Table XXI represent the responses of managers of sixteen companies engaged in the electrical and electronics industries.

The study of electrical industries provides industrial arts students with the opportunity to learn many of the fundamentals of electrical energies and their applications. These studies may include direct current, alternating current, resistance, conduction, magnetism, resonant circuits,

TABLE XX

RESPONSE RECEIVED FROM ONE COMPANY ENGAGED IN ARCHITECTURAL
WOODWORKING CONCERNING THE AVAILABILITY AS A LOCAL
INDUSTRIAL RESOURCE FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	0	1
2. Would your firm permit industrial arts teachers to tour your plant?	0	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	1
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	0	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	0	1
6. Would your firm place sample products in the industrial arts classrooms?	0	1
7. Does your firm have literature concerning your product and manufacturing processes?	0	1
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	1
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	0	1

TABLE XXI

RESPONSES RECEIVED FROM SIXTEEN COMPANIES ENGAGED IN THE
ELECTRICAL INDUSTRIES CONCERNING THEIR AVAILABILITY
AS LOCAL INDUSTRIAL RESOURCES FOR USE
IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	13	3
2. Would your firm permit industrial arts teachers to tour your plant?	12	4
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	3	13
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	10	6
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	11	5
6. Would your firm place sample products in the industrial arts classrooms?	3	13
7. Does your firm have literature concerning your product and manufacturing processes?	5	11
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	5	11
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	5	11

vacuum-tube fundamentals, radio frequency power generation, wave propagation, antennas, care of electrical devices, and many others.

Twelve of the sixteen managers extended an invitation to industrial arts students to visit their firms and thirteen of the managers extended the facilities of their firms for visitation by industrial arts teachers. This constitutes a substantial majority of the firms contacted. Three of the company executives were of the opinion that their firms would be interested in conducting a seminar for industrial arts teachers. Two of these companies were engaged in the electroplating industries. Approximately one-third of the managers indicated some literature and other aids and information were available. The literature offered was largely of a highly technical nature.

The electrical equipment and supply companies, in some cases, do not manufacture products. Some companies such as those contacted in this study, market products manufactured by other companies as well as manufacture their own products. Table XXII presents data concerning the responses received from the managers of four companies in the electrical equipment and supplies industry.

When asked the question concerning the availability of literature concerning their products and manufacturing processes, two managers stated the literature which their

TABLE XXII

RESPONSES RECEIVED FROM FOUR COMPANIES ENGAGED IN ELECTRICAL EQUIPMENT AND SUPPLY CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	3	1
2. Would your firm permit industrial arts teachers to tour your plant?	3	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	4
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	2	2
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	3	1
6. Would your firm place sample products in the industrial arts classrooms?	0	4
7. Does your firm have literature concerning your product and manufacturing processes?	2	2
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	2	2
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	3

companies had would be available to industrial arts teachers. When questioned about the possibility of placing sample products in the industrial arts classrooms and showrooms, the managers explained that their company policies prohibited any such action.

Seventy-five per cent of the responses were in the affirmative concerning the question of visitation. The one negative answer was received because the managers believed the students would not find enough information to warrant a visit.

None of the firms' managers were interested in offering a seminar for industrial arts teachers. However, two managers indicated their firms would co-operate in making an employee available to assist occasionally in industrial arts classes. Three managers reported the employees of their companies would be allowed to give assistance to teachers at any time.

One electro-mechanical equipment company was contacted. The data secured during an interview appear in Table XXIII. The man in charge of public relations for this company responded favorably to all the questions asked during the interview except one. He reported that the placing of sample products in the industrial arts classroom or showroom would violate company policies. Industrial arts students and teachers would be allowed to visit this company, as indicated by the data in Table XXIII. All areas of this company,

TABLE XXIII

THE RESPONSE RECEIVED FROM ONE COMPANY ENGAGED IN ELECTRO-MECHANICAL WORK CONCERNING THE AVAILABILITY AS A LOCAL INDUSTRIAL RESOURCE FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	1	0
2. Would your firm permit industrial arts teachers to tour your plant?	1	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	1	0
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	1	0
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	1	0
6. Would your firm place sample products in the industrial arts classrooms?	0	1
7. Does your firm have literature concerning your product and manufacturing processes?	1	0
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	1	0
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	0

however, could not be visited because some of the classified products manufactured by this company; certain areas, processes, and products are restricted to company personnel. The response to the question, "Does your firm have any other available information that would be useful to industrial arts teachers?" was affirmative. Information available from this company consisted of movies depicting some of the manufacturing processes and products and motion pictures explaining various technical aspects involved in manufacturing.

Of the three managers interviewed representing manufacturers of electronic equipment only one believed that his firm could supply any assistance to the industrial arts students and teachers. The data concerning these three companies are presented in Table XXIV. None of the managers interviewed could provide any literature concerning their products and manufacturing processes. The managers of two of the manufacturing firms believed their employees and physical plants would be available to give assistance to industrial arts teachers. This assistance could be provided in the regular industrial arts classes or in the firms' physical plants. A negative response was given to the question of conducting seminars for industrial arts teachers. Two managers of three electronic equipment companies interviewed reported that their firms would allow employees to assist in industrial arts classes. The manager of one firm reported aids would be

TABLE XXIV

RESPONSES RECEIVED FROM THREE COMPANIES ENGAGED IN ELECTRONIC
EQUIPMENT WORK CONCERNING THEIR AVAILABILITY AS LOCAL
INDUSTRIAL RESOURCES IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	2	1
2. Would your firm permit industrial arts teachers to tour your plant?	2	1
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	3
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	2	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers, outside of regular classes?	2	1
6. Would your firm place sample products in the industrial arts classrooms?	1	2
7. Does your firm have literature concerning your product and manufacturing processes?	0	3
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	3
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	2

available to the industrial arts teachers. These aids are primarily in chart form and depict the various production operations used in the manufacture of electronic equipment. Other charts are available for each of the various pieces of equipment. These charts give the nomenclature and operation of special electronic equipment.

Responses of the managers of six companies engaged in the electroplating industry are presented in Table XXV. One of the six electroplating companies owner stated that he had written an article on electroplating for one of the leading industrial magazines and the article may be obtained from the author and duplicated for the students and teachers of the Dallas Independent School District (4). Two of the managers interviewed for this study reported that other available aids could be supplied by their firms. These aids would be small samples of the different types of electroplating done in these companies. These samples of electroplating would allow the industrial arts students to compare the various types. The owners of two of the six firms replied "Yes" to the question concerning assisting with seminars for industrial arts teachers. One of the owners stated he had recently discussed the possibility of conducting a seminar with Bragg Stockton the consultant of Industrial Arts and Vocational Education for the Dallas Independent School District (5).

Table XXVI presents data concerning the responses of the managers of two electronics companies. A large portion

TABLE XXV

RESPONSES RECEIVED FROM SIX COMPANIES ENGAGED IN ELECTRO-
PLATING WORK CONCERNING THEIR AVAILABILITY AS LOCAL
INDUSTRIAL RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	4	2
2. Would your firm permit industrial arts teachers to tour your plant?	4	2
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	2	4
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	5	1
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	5	1
6. Would your firm place sample products in the industrial arts classrooms?	1	5
7. Does your firm have literature concerning your products and manufacturing processes?	2	4
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	2	4
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	2	4

of the finished products of these companies is manufactured for military use. Therefore, some of the areas in the plants are restricted. Despite this restriction the two men in charge of public relations for these companies welcomed visits by industrial arts students and teachers. Both men indicated their companies would not be interested in arranging and conducting a seminar but would permit their employees to assist teachers during their regular classes or give assistance at some other convenient time. Sample products to be placed in the industrial arts classrooms or showrooms were available from one of the two companies and would be available from time to time but not in the ever-ready supply.

The Paint, Varnish, and Wood Finishing Industries

The ancient art of applying a decorative and protective finish has today evolved into something more than a choice of a finish that is pretty, durable, or protective. Finishes today are selected with the eye and the mind to create new and pleasant surroundings in factories, hospitals, schools, homes, churches, and other structures. The psychological effects of color have created the mental attitude desirable in many situations. Versatility of scientific color applications has added immeasurably to the attractiveness of man's surroundings.

The research conducted by the manufacturers of paint, varnish, and other finishes involves not only the methods

TABLE XXVI

RESPONSES RECEIVED FROM TWO COMPANIES ENGAGED IN ELECTRONICS
WORK CONCERNING THEIR AVAILABILITY AS LOCAL INDUSTRIAL
RESOURCES FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	2	0
2. Would your firm permit industrial arts teachers to tour your firm?	2	0
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	0	2
4. Would your firm co-operate by having an employee available to assist the industrial arts classes, not more than one time each semester?	2	0
5. Would your firm co-operate in making an employee available to assist industrial arts teachers outside of regular classes?	2	0
6. Would your firm place sample products in the industrial arts classrooms?	1	1
7. Does your firm have literature concerning your product and manufacturing processes?	0	2
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	0	2
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	1	1

relating to the pigments, vehicles, and binders used in finishes, but also the psychosomatic effect of color on individuals. These industries are important in that they provide for mankind the recourse to enjoy pleasing color harmony as well as the protective benefits of the finishes applied.

Table XXVII presents data concerning the responses of men in charge of public relations for sixteen paint, varnish, and wood finishing manufacturers. Thirteen of these men extended a welcome to industrial arts teachers and students to visit their firms. Five of the men in charge of public relations were positive their companies would enjoy the opportunity of conducting a seminar. The director of laboratories of one firm said the paint manufacturing industry is very interested in helping in the public schools (6). He is a member of the Paint Production Club and a branch of this club is located in Dallas, Texas. During 1955 a teacher was selected to attend a six-weeks seminar held in North Dakota. The purpose of this seminar was to acquaint teachers with the occupational opportunities available in this field. Table XXVII includes the responses for the paint, varnish, and wood finishing manufacturers.

One other industrial arts area has not been discussed in this chapter. It was assumed that a majority of the

TABLE XXVII

RESPONSES RECEIVED FROM SIXTEEN COMPANIES ENGAGED IN PAINT,
VARNISH AND FINISH MANUFACTURING CONCERNING THEIR
AVAILABILITY AS LOCAL INDUSTRIAL RESOURCES
FOR USE IN INDUSTRIAL ARTS

Question	The Number of Companies and Their Responses	
	Yes	No
1. Would your firm permit industrial arts students to tour your plant?	13	3
2. Would your firm permit industrial arts teachers to tour your plant?	13	3
3. Would your firm assist in arranging and conducting a seminar for industrial arts teachers?	5	11
4. Would your firm co-operate by having an employee available to assist industrial arts classes, not more than one time each semester?	10	6
5. Would your firm co-operate in making an employee available to assist teachers outside of regular classes?	11	5
6. Would your firm place sample products in the industrial arts classrooms?	9	7
7. Does your firm have literature concerning your product and manufacturing processes?	7	9
8. Would your firm make this information available to the students in the industrial arts classes in the Dallas Independent School District?	7	9
9. Does your firm have any other available information that would be useful to the teachers of industrial arts?	4	12

available industries would operate a drafting room or engineering department or both. Therefore, the area of drafting was assumed to be included in the other areas discussed.

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CHAPTER VI

THE EXTENT OF USE OF LOCAL INDUSTRIAL RESOURCES AVAILABLE TO THE INDUSTRIAL ARTS PROGRAM

The preceding chapter has presented data and information concerning the reaction of a number of industrial firms with respect to human and material resources available from local manufacturing firms. The extent to which these human and material resources are utilized in the Dallas Independent School District will be presented in this chapter.

A total of 130 industries operating in four areas were contacted for the purpose of determining to what extent the industries were being used for instructional purposes. The data presented in Table XXVIII represent the responses of executives of the 130 industries engaged in manufacturing products in the general areas of metal, wood, electrical, paints-varnish, and wood finishes.

In response to the question "Have any students enrolled in industrial arts classes toured your plant recently?" seven company managers reported that 191 students had visited their firms, 120 managers of the firms contacted for this study indicated they had not been visited by students. In response to a similar question, regarding teacher visitation, 102 of the managers indicated their firms had not been visited

TABLE XXVIII

RESPONSES RECEIVED FROM 130 COMPANIES CONCERNING THE
EXTENT OF THEIR USE AS LOCAL INDUSTRIAL
RESOURCES IN INDUSTRIAL ARTS

Question	Number of Companies and Their Responses	
	Yes	No
1. Have any students enrolled in industrial arts classes toured your plant recently?	7	123
2. Have any industrial arts teachers visited your plant recently?	28	102
3. Has your firm assisted in conducting any seminars for industrial arts teachers recently?	7	123
4. Has any member of your firm assisted in any way in any industrial arts classes recently?	15	115
5. Have any members of your firm assisted industrial arts teachers outside of regular classes recently?	20	110
6. Has your firm placed any sample products in the industrial arts classrooms recently?	8	122
7. Has your firm placed any available literature concerning your product and manufacturing processes, in the industrial arts classrooms recently?	21	109

by any of the local industrial arts teachers. However, twenty-eight managers estimated that a total of 201 teachers had visited their firms.

Seven of the managers reported they had assisted in organizing and conducting seminars for industrial arts teachers. In response to question four of Table XXVIII, the managers interviewed reported fifteen representatives of their firm had assisted in industrial arts classes. Twenty managers reported their firms had assisted industrial arts teachers in some way outside of their regular classes. The responses to question seven in Table XXVIII show that twenty-one firms supplied literature pertaining to their products and manufacturing processes to the industrial arts classrooms. These managers estimated that the students in 341 classrooms had benefited from this literature.

Table XXIX presents data concerning the responses of forty-seven of the fifty-six industrial arts teachers who were teaching in the Dallas Independent School District during the 1955-1956 school year. Forty of the industrial arts teachers reported they used sample products for instructional purposes whenever feasible. Their affirmative answer to the question "Do you use sample products whenever feasible?" was prefaced by the statement that the products used did not offer any type of advertising and those products which could not be used without advertising this product were not

TABLE XXIX

RESPONSES MADE BY FORTY-SEVEN INDUSTRIAL ARTS TEACHERS
INDICATING THE EXTENT TO WHICH AVAILABLE LOCAL
INDUSTRIAL RESOURCES ARE USED IN THE
INDUSTRIAL ARTS PROGRAM

Question	Number of Teachers and Their Responses	
	Yes	No
1. Have you taken students in your industrial arts classes on any visits to industry?	5	42
2. Have you visited any industrial plants recently?	39	8
3. Do you attend seminars made possible through the co-operation of industry?	46	1
4. Have you invited persons to come into your industrial arts shop to serve as resource persons recently?	21	26
5. Have you contacted resource persons outside your classes for the purpose of obtaining information to be used in your classes?	40	7
6. Do you use sample products whenever feasible?	40	7
7. Do you use industrial literature that is available for instructional purposes in your industrial arts classes?	46	1
8. Do you use available audio-visual aids prepared by industry?	39	8
9. Do you use industry in any other way?	29	18

considered. Approximately 87 per cent of the teachers indicated they had not taken their students on visits to industry. Eighty per cent, however, had visited industries personally.

Twenty-one teachers reported they had invited persons to visit their industrial arts laboratories and to serve as resource persons. Almost double that number contacted people outside of their classes for the purpose of obtaining information to be presented in class as indicated in Table XXIX.

Bragg Stockton, the consultant for Industrial Arts and Vocational Education for the Dallas Independent School District, has been responsible for organizing and conducting a number of seminars. Stockton (1) stated "the industrial arts teachers had been offered seventeen seminars, in various areas, during the last four years." The seminars organized and conducted for industrial arts teachers are presented in Table XXX. The seminars were made possible through the co-operation of local industry and co-ordinated by Bragg Stockton, consultant for Industrial Arts and Vocational Education. All industrial arts teachers in the Dallas Independent School District were invited to attend; however, each seminar was organized and offered for one specific instructional area.

The responses of the industrial arts teachers to two questions which were not presented in tabular form are as

TABLE XXX

SEMINARS ORGANIZED AND CONDUCTED FOR INDUSTRIAL ARTS
TEACHERS IN THE DALLAS INDEPENDENT SCHOOL DISTRICT
DURING THE YEARS 1952 THROUGH 1956

Subject of Seminars	Number of Seminars
Electroplating	1
Electricity	1
Sheet Metal	1
Metal Spinning	2
Wrought Iron	1
Welding	2
Architectural Drawing	1
Structural Steeling Drawing	1
General Mechanical Drawing	1
Upholstry	1
Leather Craft	1
Plastics	2
Wood Finishing	2

follows: The first question was "Would you take your industrial arts classes on tours of industry if time and arrangements could be made with industry?" The second question was "Would you visit industrial plants if arrangements could be made for you to do so?" The responses to both questions were affirmative in all cases. Most of the interviewees added that they believed a program which would permit a more adequate utilization of industrial visitation should be instituted.

Data concerning the extent of use of the local industrial resources have been presented and analyzed. These data include recorded responses of executives of 130 manufacturing firms and forty-seven industrial arts teachers.

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CHAPTER VII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

During the industrial revolution manufacturing shifted from the home to the factory, thus removing from the home the opportunity for young people to satisfy their tendencies to explore and create by using tools and materials. The opportunity for young people to understand the world of practical affairs was also removed. When young people are involved in a study utilizing scientific and mechanical devices and modern industrial procedures exceptional opportunities for the development of an intellectual culture result. The development of an intellectual culture may best be accomplished through education; and education should be determined by the needs of the society to be served, the character of the individuals to be educated, and the knowledge of theory and practice available.

The problem of this study was to study local industrial resources, their availability, and extent of use in the teaching of industrial arts in the Dallas Independent School District, Dallas, Texas. The industrial resources included a variety of local manufacturing concerns. The types of

local industry included wood industries, metal industries, electrical industries, and industries dealing in paint, varnish, and wood finishes.

The specific purposes of this study were fourfold and are as follows: first, to study the local industrial resources; second, to assemble and analyze data concerning the availability of local industrial resources for the instructional enrichment of the industrial arts program; third, to assemble and analyze data concerning the extent of use of available industrial resources in teaching industrial arts in the Dallas Independent School District; and fourth, to make recommendations and conclusions based on the findings of the study.

Data were obtained from two sources. The primary source included personal interviews with personnel representing local manufacturing concerns and industrial arts teachers. The secondary source included data and information secured from the libraries, the Industrial Arts Department of the Dallas Chamber of Commerce, and the Dallas Independent School District.

Certain related studies in the field of utilization of local community resources were reviewed. These studies substantiated the fundamental soundness for the use of local resources for the educational program. Individual and community needs form the basis of the necessity of keeping

abreast with industrial development of society, and the studies indicated that the use of available community resources as instructional aids is democratically, psychologically, and sociologically sound.

Three tabular presentations accompany the discussion of the types of local industrial resources. Data presented in the tables provide a background concerning industry groups, population characteristics, and employment trends. These data provide a basis upon which projected estimates may be made. Factory employment during the 1940 and 1950 census period increased 103.5 per cent, or from 26,700 employees in 1940 to 55,215 in 1950. The factory employment was at a peak level of 83,190 in 1956. Based on the data available, the projected industrial increases appear almost certain.

Data concerning the availability of local industrial resources for use in the industrial arts program were presented. These data present the responses of executives of manufacturing enterprises and offer a comparison of the various industry groupings within the four major manufacturing areas included.

The extent of use of local industrial resources in the instructional enrichment of the industrial arts program was ascertained and presented. The data presented contain the responses of the industrial arts teachers in the Dallas Independent School District.

Findings

1. Local industry will co-operate in enriching the educational program by making their plants available for visitation by industrial arts students and teachers, providing literature relating to their products, providing sample products, and other human resources. Human resources were offered in three ways: first, by providing personnel to speak to classes of students; second, by providing personnel to help industrial arts teachers in laboratory work but not during class periods; third, by providing opportunities for the industrial arts teachers to consult employees on problems related to manufacturing processes, materials, tools and equipment.

2. Five of the forty-seven teachers contacted in the study had taken industrial arts students to visit local industry and thirty-nine teachers had visited local industry.

3. The policies of the Dallas Independent School District governing field trips do discourage field trips in two ways: first, the time limit maximum of ninety minutes for a field trip does not allow sufficient time to visit industry, due to the time consumed in transit to and from the industry; second, the numerical limit of two field trips which may be made in one term prohibits the use of field trips at the most opportune time for instructional purposes.

4. A majority of the teachers expressed the desire to improve the policies governing field trips so that more adequate use of the local industrial resources could be attained.

5. Teachers utilize industrial resources by bringing industry into the classrooms in the following ways: teacher visitation of industry; seminars sponsored by industry; use of sample products, available literature, motion pictures, film strips, and slides; invitations to resource persons to visit the industrial arts classrooms; and through contacting resource persons outside of class to obtain information to be used in class.

6. The total potential of local industrial resources in Dallas, Texas, was not determined in this study; however, a sampling of the wood, metal, electric, and finishes industries indicates there are many resources available for use in the industrial program.

Conclusions

The following conclusions are based on the human and documentary data and information assembled and analyzed in this study. The conclusions are as follows:

1. Education should be determined by the needs of the society to be served, the character of the individuals to be educated, and the knowledge of educational theory and practice available.

2. The educational program should be recognized as a community responsibility with goals determined or defined through participation of different segments of society.

3. A meaningful linkage of the school and other environmental agencies should be a mutual contract for social and economic advancement of a society by cementing together the struggle to overcome the common problems.

4. The community is a laboratory filled with cultural, civic, economic, and social problems which will serve as an immediate and practical program of learning by providing the interesting stimuli that make learning more interesting. In the use of a community related program, the student sees his class work related to the life around him.

5. Some of the values that could result from utilizing community resources for the industrial arts program are: one, local industrial resources can be brought to the attention of the students; two, improved relationships and more understanding may result between the school and the community; three, otherwise unavailable materials and instructional aids may be provided; four, efficiency of the educational program may be increased; five, students may be offered a fairly true picture of the profession or occupation under the conditions under which the work is done; six, the students' views of occupations and their possibilities may be broadened, as well as learning related and scientific facts.

6. The extent of use of local industrial resources by the industrial arts teachers in the Dallas Independent School District appears to be satisfactory except in the area of student visitation of industry which is governed by school policies.

7. Industrial arts teachers utilize local industrial resources in many ways for the instructional enrichment of the industrial arts program.

8. The lack of use of industrial resources through visits to manufacturing firms with industrial arts students may relate to school policies that may tend to discourage field trips.

9. Industry has extended its assistance in various ways, and its availability is of a sufficient quantity to support a progressive program of resource utilization by the local industrial arts teachers.

10. The projected estimates for increases in the industrial population in Dallas, Texas, indicate a necessity of re-exerted efforts to utilize the local industrial resources for the instructional enrichment of the industrial arts program.

Recommendations

As a result of analyzing the data and information used in this study, the following recommendations are made:

1. Extensive studies should be made of the various areas of local industry groupings. These studies should be under the direction of the administrator in charge of curriculum and made with co-operation of representatives of industry. Each study should present extensive data and information pertinent to each industry group in order that all available resources in each group may be identified and utilized educationally to its fullest extent. Provisions should be made for keeping the information current.

2. The industrial arts teachers should make a study of the present policies governing field trips to ascertain if recommendations regarding the modification of the present policies governing field trips are needed. The time away from school for field trips may need to be extended to allow at least one hour of actual visiting time. This time should not include travel time.

3. The policy stating that only two field trips may be made during each school term should be modified to provide for field trips to be made at the psychologically opportune time during the study of any industry or industrial area.

APPENDIXES

APPENDIX A

QUESTIONNAIRE USED IN INTERVIEWS WITH MANAGERS AND OWNERS

Firm _____ Date _____
Address _____ Telephone _____
Product Classification _____
Interviewee _____ Position _____

This is a survey to attempt to determine the extent of industrial resources available to the industrial arts program in the Dallas Independent School District.

The industrial arts program in Dallas is a part of the general educational program that tends to develop within the individual an interest in industry and an understanding of industrial processes. Through the study of tools, materials, and the production of useful and significant products, the pupil advances in appreciation of consumers' problems and needs.

Members of our society are confronted with a maze of products from a wide variety of manufacturing concerns and are by necessity forced to make a choice of which products to use. In offering an opportunity to prospective consumers for a better understanding of the problems and processes involved in manufacturing, the manufacturer may benefit in two ways: One, consumers who understand a product will be able to make a wiser choice in their purchases; and two, consumers who are interested in entering the field of manufacturing will have a better understanding of the problems and processes and therefore will have an understanding of the employment opportunities.

With your co-operation, your firm and the 8,000 students enrolled in the industrial arts program in the Dallas Independent School District should profit by furthering this consumer knowledge. Would your firm co-operate to your own advantage in one or more of the following ways? If so, it should be understood that proper arrangements and preparations will be made in advance.

1. Have you had any students enrolled in industrial arts classes tour your plant recently? Yes ___ No ___
 - (a) If so, approximately how many? _____
 - (b) Would your firm permit industrial arts students to tour your plant? Yes ___ No ___

2. Have any industrial arts teachers visited your plant recently? Yes _____ No _____
- (a) If so, approximately how many? _____
- (b) Would your firm permit industrial arts teachers to visit your plant? Yes _____ No _____
3. Has your firm assisted in conducting any seminars for industrial arts teachers recently? Yes _____ No _____
- (a) If so, approximately how many? _____
- (b) Would your firm assist in arranging and conducting a seminar for industrial arts teachers? Yes _____ No _____
4. Has any member of your firm assisted in any way in any industrial arts classes recently? Yes _____ No _____
- (a) If so, approximately how many times? _____
- (b) Would your firm co-operate in making an employee available to assist the industrial arts classes, not more than one time each semester? Yes _____ No _____
5. Have any members of your firm assisted industrial arts teachers outside of regular classes recently? For example, have you assisted any teachers in solving any problems such as finishing, fabricating, material processing, or operation of equipment? Yes _____ No _____
- (a) If so, approximately how many times? _____
- (b) Would your firm co-operate by having an employee assist teachers outside of regular classes? Yes _____ No _____
6. Has your firm placed sample products in the industrial arts classrooms or showrooms recently? Yes _____ No _____
- (a) If so, approximately how many classrooms or showrooms _____
- (b) Would your firm place sample products in the industrial arts classrooms, or showrooms? Yes _____ No _____
7. Has your firm placed any available literature, concerning your product and manufacturing processes, in the industrial arts classrooms? Yes _____ No _____

- (a) If so, approximately how many classrooms? _____
- (b) Does your firm have literature concerning the product and manufacturing processes that would be available to the industrial arts teachers? Yes ____ No ____
- (c) If so, would you make it available to students in the industrial arts classes of the Dallas Independent School District? Yes ____ No ____
8. Do you have any other aids that would be useful and available to the industrial arts teachers? Yes ____ No ____
- (a) What are the aids? _____
-

QUESTIONNAIRE USED IN CONDUCTING INTERVIEWS
WITH INDUSTRIAL ARTS TEACHERS

Name _____ Date _____
Address _____ Telephone _____
School Name _____
Industrial Arts Area _____ Grade Taught _____

This is a survey to determine to what extent industrial arts teachers in the Dallas Independent School District use local industrial resources for instructional enrichment of the industrial arts program.

1. Have you taken students in your industrial arts classes on any visits to industry? Yes ____ No ____
 - (a) If so, approximately how many visits? _____
 - (b) Would you take your industrial arts classes on tours of industry if time and arrangements were made with industry? Yes ____ No ____
2. Have you visited any industrial plants recently?
Yes ____ No ____
 - (a) If so, approximately how many times? _____
 - (b) Would you visit industrial plants if arrangements could be made for you to do so? Yes ____ No ____
3. Do you attend seminars made possible through the co-operation of industry? Yes ____ No ____
 - (a) If so, approximately how many? _____
4. Have you invited persons to come into your industrial arts shops to serve as resource persons recently?
Yes ____ No ____
 - (a) If so, approximately how many persons? _____

5. Have you contacted resource persons outside your classes for the purpose of obtaining information to be used in your classes? Yes ____ No ____

(a) If so, approximately how many? _____

6. Do you use sample products whenever feasible? Yes ____ No ____

(a) If so, approximately how many products each semester? _____

7. Do you use industrial literature that is available for instructional purposes in your industrial arts classes? Yes ____ No ____

8. Do you use available audio-visual aids prepared by industry? Yes ____ No ____

(a) If so, what types do you use? _____

9. Do you use industry in any other way? Yes ____ No ____

(a) If so, how do you use industry as a resource material?

APPENDIX B

NAMES AND LOCATIONS OF INDUSTRIAL FIRMS CONTACTED

METAL

FOUNDRIES

Ace Brass and Aluminum Casting Co.
1203 S. Industrial

Western Sealant of Dallas
6801 West Jefferson

Dallas Foundry, Inc.
3103 Elm

Refinery Castings Corp.
1813 Commerce

Shaw Foundry
1901 Burbank

Stevenson's Foundry
730 Ezekiel

Foundries, Inc.
1651 E. Main
Grand Prairie, Texas

Trojan Foundries, Inc.
1500 Plantation Road

The Grimes Co.
6835 Forest Park Road

Trinity Brass & Copper Co., Inc.
3125 Ross

WELDING

Dallas Welding Works
4222 East Side

Dugas, E. R., Machine Shop
617 Yuma Ct.

Good Welding Works
2402 Main

Lone Star Welding
1220 Second

Southwestern Sheet Metal & Mfg. Co.
5307 Maple

Travis Welding Works, Inc.
4901 S. Lamar

WELDING SUPPLIES AND EQUIPMENT

Big Three Welding Supply Co., Inc.
4532 Singleton

Griggs-Weaver Machine Co.
5000 Harry Hines

Hill Equipment & Supply Co.
1745 Levee

Machinery Sales and Supply Co.
3405 Commerce

Marquette Appliance Co.
1422 Slocum

National Cylinder Gas Co. of Texas
3301 S. National

Texas Welding Supply Co.
1300 McKinney

Welders Supply Inc.
430 S. Industrial

SHEET METAL PRODUCTS

American Sheet Metal Co.
608 First

Butler Engineering Co.
Goforth Road

Guiberson Corp., The
1000 Forest Ave.

Higgins Sheet Metal Works
1216 Ross

Mustang Sheet Metal & Mfg. Co.
3113 Canton

Pines Mfg. Co.
1031 Clarence

Pioneer Sheet Metal Mfg. Shop
4105 Worth

Polley Bros. & Verson, Inc.
6251 Wyche Blvd.

Stone Co., Inc.
1716 Plantation Road

Walker Sheet Metal Co.
3153 Oak Grove

SHEET METAL EQUIPMENT

Machinery Sales & Supply Co.
3405 Commerce

Moncrief-Lenoir Mfg. Co.
2751 Combs

MACHINE SHOPS

Diamond Machine Co., Inc.
314 S. Rock Island

Industrial Machine and Welding Co.
1217 S. Industrial Blvd.

Gruen Tool and Die Co.
5222 Redfield

Maeder, H. A. Instrument Co.
1112 Hartsdale Dr.

Mosher Steel Co.
5101 Maple

Polley Bros. & Verson Inc.
6251 Wyche Blvd.

Servis Equipment Co.
1000 Singleton Blvd.

Smallwood & Son Machine Co.
200 Smallwood Road

Smith, Ed W., Machine Works
113 Murray

METAL WORKING MACHINERY

Long Machine Tool Co.
2801 Elm

Machinery Sales and Supply Co.
3405 Commerce

Nicholas & Park Machine Co.
2800 Commerce

Tri-State Machinery Co.
3002 Commerce

IRON: ORNAMENTAL

AAA Ornamental Iron Works
325 Hilburn

Bohon Ornamental Iron
2015 W. Clarendon

C & S Iron Works
3801 Fordham

Central Model Ironcraft Studio
4527 Central Expressway

Chatelain Co.
729 E. 15th

Dallas Iron Works
3301 Oak Lane

Dallas Iron & Wire Works, Inc.
6025 Denton Dr.

Feaster, V. L., & Co.
6507 Maple

Jewett Ornamental Iron
622 W. Davis

Krider's Ornamental Iron
1600 Anson Road

Mosher Steel Co.
5101 Maple

Peyton Spur Cleat Co.
5715 Hudson

Potter Art Iron Studios
2927 N. Henderson

Pre-Kut Ornamental Iron Co. of Dallas
6025 Denton Drive

Real Art Metals Co.
10520 Hines Blvd.

Texas Iron & Wire Works
406 S. Haskell

STEEL FABRICATED

Anchor Metals, Inc.
Hurst, Texas

Atlas Metal Works, Inc.
818 Singleton Blvd.

Gen. Metal Products Inc.
3909 Overton Road

Hughes Steel Co.
3600 E. Main
Grand Prairie, Texas

Mosher Steel Co.
5101 Maple

Parks Iron Works
3415 Singleton Blvd.

Servis Equipment Co.
1000 Singleton Blvd.

Weaver Bros.
3203 Gunter

Welding Laboratory, The
4033 Commerce

WOOD

FIXTURES: STORE

Adleta Show Case & Fixture Mfg. Co.
1914 Cedar Springs

Coerver, Otto Co., Inc.
4032 Commerce

Klimist Store Fixture Mfg. Co.
1107 Jackson

Nuss, Fred, Cabinet Shop
2719 Southwell

Southwest Fixture Co.
907 Commerce

Standard Show Case Works
2330 Harrison

FURNITURE

Burdick Mfg. Co.
3400 Armstrong

Erwin & Howard Mfg. Co.
915 S. Peak

Fine, W. R., Galleries
2524 Cedar Springs

Guilderaft Interiors
4433 Lovers Lane

Hammond Furniture Co.
2242 Butler

Morton, Steve, Custom Furniture
1409 W. Clarendon

Williams, Gene, Cabinet Shop
2514 Lucas Dr.

Volker, William, & Co. of Texas Inc.
1700 Cockrell

Porta-Bed Inc., The
2811 Danford

Allied Textile Co.
2930 Main

Pan American Mfg. Co.
1755 Proctor

Falcon Mfg. Co., Inc.
148 Fordyce

U. S. Furniture Corp.
1304 S. Austin

Arno's Interiors
4114 Maple

The Furniture Workshop
N. Central Expressway at Valley View Road

Roberts Mfg. Co., Inc.
129 Southeast 17th
Grand Prairie, Texas

Caruthers Mfg. Co.
321 S. Edgefield

Kroehler Mfg. Co.
6700 Denton Dr.

Rattan Furniture Shop Inc.
1716 Cedar Springs

WOOD PRODUCTS

Baldwin Co.
2455 Manana

Slaughter, Lee R., Lumber Co.
5403 Maple

WOODWORKING

Coerver, Otto, Co., Inc.
4032 Commerce

T Square Cabinet Shop
4214 Maple

WOODWORKING ARCHITECTURAL

The Deluxe Cabinet Shop
5613 E. University

ELECTRICITY

ELECTRIC EQUIPMENT AND SUPPLIES

Graybar Elec. Co.
717 Latimer

Griffin Mfg. Co.
6115 Denton Dr.

Newlon Mfg. Co. Inc.
1202 W. Commerce

Southern States Equipment Co.
Slocum & Cole

Standard Electric Manufacturing Co.
2401 Federal

Volker, William, & Co. of Texas, Inc.
1700 Cockrell

ELECTRO MECHANICAL EQUIPMENT

Texas Instruments Inc.
6000 Lemmon

ELECTRONIC EQUIPMENT

Collins Radio Co., Texas Div.
1930 High Line Dr.

Dallas Radionics
3519 Mt. Washington

Dalworth Mfg. Co.
Northwest 19th
Grand Prairie, Texas

Geotechnical Corp.
3712 Haggard Dr.

Standard Instruments
1805 Westway
Garland, Texas

Varo Mfg. Co.
Garland, Texas

ELECTRONICS

Collins Radio Co., Texas Div.
1930 Irving Blvd.

Grandall Eng. & Mfg. Co.
Virginia Road
Irving, Texas

Varo Mfg. Co., Inc.
Garland, Texas

ELECTROPLATING

Ace Plating Co.
4630 Maple

Electro Plating & Mfg. Co., Ltd.
1718 Browder

Lane Plating Works
5322 Bonnie View Road

Liberty Plating & Processing Co.
410 Hilburn

R & L Plating Co.
8020 Ceder Springs

Texas Electro Plating Co.
2408 Swiss

Thomas Plating Works
4901 S. Lamar

White Plating & Processing Co.
715 W. Davis

WOOD FINISHES

PAINT AND VARNISH

Acme Quality Paint Inc.
4112 Commerce

Brown, Andrew, Co.
P. O. Box 246
Irving, Texas

Collins-Davoust Paint Mfg. Co.
2430 Shorecrest

Dalworth Paint Mfg. Co.
7900 Edam Road

De Soto Paint & Varnish Co.
Forest Lane and Shiloh Road
Garland, Texas

Draegert, C. H., Co., Inc.
2518 Chalk Hill Road

Hanna Mfg. Co. of Texas
1219 S. Industrial Blvd.

Jones-Blair Paint Co.
6969 Denton Dr.

Magnolia Petroleum Co.
Magnolia Bldg.

Martin-Senour Co.
4121 Commerce

National Lead Co.
9595 Terminal

Nu-Enamel Co.
8416 Preston Road

Pittsburgh Plate Glass Co.
1421 N. Industrial Blvd.

Pratt Paint & Varnish Co.
3126 Factory

Preston Co.
2241 Irving Blvd.

Sewall Paint & Varnish Co.
1306 River

Sherwin-Williams Co., The
4141 Commerce

Southern Paint & Varnish Co.
2701 S. Westmoreland

Standard Paints Inc.
1107 W. Commerce

Texas Paint & Varnish Co., Inc.
P. O. Box 747

Wamix, Inc.
2221 Irving Blvd.

WOOD FINISHING SUPPLIES

Star Chemical Co., Inc.
2619 S. Ervay

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Statement by Larson, A. R., manufacturer, Dallas, Texas,
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Statement by Van Sickle, L. J., manufacturer, Dallas, Texas,
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