

A STUDY OF METHODS, ORGANIZATION AND SUBJECT MATTER IN THE  
LABORATORY OF INDUSTRIES PLAN IN SEVENTY-FIVE PUBLIC  
SCHOOLS OF TEXAS, 1948-1949

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## CHAPTER I

### INTRODUCTION

#### Statement of Problem

A study of methods, organization and subject matter in the Laboratory of Industries plan in seventy-five public schools of Texas.

#### Purpose of the Study

The purpose of this study is to determine the extent of which the methods, organization and subject matter in the Laboratory of Industries plan, as proposed by the State Department of Education in Texas, is being used. Attention will be given to the values of the plan as recommended by the State Department of Education. The nature of the plan and the extent to which it is being used by a representation of industrial arts instructors will be presented. (In the final analysis an attempt will be made to evaluate the adequacy of the State Laboratory of Industries plan for teaching industrial arts.)

#### Need of the Study

The State Department of Education of Texas has set up and recommended the Laboratory of Industries plan as the basic course in teaching industrial arts in the public



schools. The Texas State Planning Committee for Industrial Arts Education (1938), which made a study of the methods of teaching industrial arts in the state, also recommended this plan. It has been made an integral part of the recommended course of study. However, the real test of the value of the study is to be found in its use. To be most valuable, the course of study should not be regarded as the curriculum, but as an aid in developing the curriculum. This should be indicative of the fact that the actual experiences of the teacher and the students cannot be merely those delineated in the course of study bulletin, but rather that they must be developed upon the basis of utilizing the course of study as an aid and as a guide. It is possible that the Laboratory of Industries plan, as proposed by the state course of study, is not being followed and that (composite shop (general shop and unit shop) is the plan most generally followed. This situation raises some questions: If the Laboratory of Industries plan of teaching is adequate, should it not be used by the instructors in teaching industrial arts? If the plan is not adequate, should not an immediate revision of the course of study for Laboratory of Industries be made? It is believed that these questions are of sufficient importance to justify research regarding the adequacy or inadequacy of the program from the viewpoint of teachers actually engaged in the work of teaching.

### Delimitations of the Study

The study is limited to seventy-five four-year accredited high schools of Texas whose scholastic population is 100 or more, and which offer at least one standard high school credit in the industrial arts field.

### Sources of Data

The material for this program was taken from two sources. First, the background study in the nature and use of the Laboratory of Industries plan was made through an investigation of professional literature in the field of industrial arts, committee reports, current articles, magazines, books, letters to seventeen different state departments of education over the United States, and personal interviews with teachers of industrial arts. Claimed benefits of the plan, as well as objections, were studied in the writings of various teachers and authorities in the field. The specific plan as recommended by the State Department of Education of Texas<sup>1</sup> in the course of study for industrial arts was investigated. Second, the reaction of instructors actually teaching industrial arts in the public schools of Texas was determined by a questionnaire sent to selected heads of industrial arts departments. The information received therefrom was compiled and an analysis will be made.

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<sup>1</sup>Texas State Department of Education, Industrial Arts Program, 1938, Bulletin No. 389, p. 16.

### Definition of Terms

The Laboratory of Industries plan is a basic or beginning course in industrial arts activities in which there may be a large range in industries represented through short unit courses dealing with drawing, woodwork, electricity, metal and other activities from which the pupil may develop useful basic skills and knowledge. Provisions are made to give experience, to achieve certain skills, to acquire industrial arts knowledge, and to interpret associated occupational information regarding the material and products of given industries.<sup>2</sup> These various industrial arts activities are carried on in a single room, at the same time, with one teacher in charge.

The general shop plan gives more specific training in one general industry than does the Laboratory of Industries plan. The school, teacher or pupils may select for a given course the industries and the specific units within the industries which will best serve the community or the pupil needs.<sup>3</sup>

The unit shop plan is one in which a single subject or phase of industrial arts, such as architectural drawing, cabinet-making, printing, or sheet metal is taught.<sup>4</sup>

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<sup>2</sup>Ibid., p. 16.

<sup>3</sup>Ibid., p. 15.

<sup>4</sup>Letter; Ed Davis to Albert McLeland, September, 1935, mimeographed material. Personal files of C. C. Davis, Denton, Texas.

Adequacy will be used in this study to imply or determine whether or not the Laboratory of Industries plan of teaching industrial arts is so designed, organized or administered that it gives students those experiences and training which will be most beneficial to them.

#### Method of Procedure

In selecting the number of schools to be studied in regard to their plan of teaching industrial arts, it was decided to limit the study to high schools with an enrollment of more than 100 pupils and which offer at least one unit in industrial arts. In order to ascertain the name of the industrial arts instructor, double postal cards were sent to 197 superintendents of schools in the above category.<sup>5</sup> Replies were received from 127 of these superintendents, and from these a list of 100 industrial arts instructors was made. A questionnaire<sup>6</sup> was then sent these 100 instructors. Information was sought not only about the types or methods used in teaching but concerning the instructor's professional training, experience, size of industrial arts shop, value of tools, and his opinion of the Laboratory of Industries plan of teaching industrial arts. Seventy-five replies were received and a sample of the questionnaire will be found in the appendix.

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<sup>5</sup>A copy of this postal card is found in the appendix.

<sup>6</sup>Included in the appendix.

### Related Studies

The Laboratory of Industries plan of teaching industrial arts is a comparatively new method of teaching. In March, 1937, such a plan was outlined and used experimentally in five Chicago schools. Prior to this, the movement had gained such momentum that the plan had been adopted as the major method of teaching industrial arts by the State Department of Education in Texas. A number of studies have been made of the plan and its merits or demerits, according to various opinions of instructors and writers in the field.

Lewis V. Newkirk, one of the earliest writers to experiment in the field of the laboratory type of teaching, made a study of the first two years of the work as accomplished by the Chicago schools.<sup>7</sup> He stated that in the first year of operation only five schools used the method with the total enrollment of 500 boys. In 1939, two years later, there were seventy-five schools using the plan, and the number of ninth grade boys enrolled numbered over 8,000. In the majority of these schools, the shops were transformed into industrial arts laboratories.

The major characteristics of the plan, as outlined by Newkirk, were:

1. The Laboratory of Industries plan was

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<sup>7</sup>Louis V. Newkirk, "Chicago Industrial Arts Laboratory Plan," Industrial Arts and Vocational Magazine, XXXIII (March, 1939), pp. 100-102.

offered to ninth grade boys in general or academic high schools.

2. Classes met five double periods each week with five additional periods for drawing.

3. The work was required of those students planning to take a technical course but otherwise was elective.

4. The standard size class was twenty-five to thirty students.

5. The shop course consisted of 80 per cent work with tools and the remaining 20 per cent was comprised of related educational features.

6. The course was given only in general educational high schools and their branches and was motivated by the purposes of general education.<sup>8</sup>

The objectives of the Laboratory of Industries plan were outlined as follows:

1. Interpret the modern industrial and trade world to boys in the academic high schools.

2. Provide handwork experiences with a variety of tools and construction materials typical of modern trade and industrial life.

3. Provide opportunities for developing desirable personality and social traits.

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<sup>8</sup>Ibid., pp. 100-102.

4. Provide craft experiences for leisure time interests and promote the development of the home workshop.<sup>9</sup>

In discussing the Laboratory of Industries plan, Newkirk stressed the importance of the teacher. He said that the teacher is the major factor in the functioning of an industrial arts laboratory. He described teacher requirements in this manner:

The teacher should be a man who likes to work with boys and who gets along well with boys. The essential training of an industrial arts laboratory teacher divides itself naturally into cultural, technical, and professional.

No teacher is prepared to handle the industrial arts laboratory until he has had a thorough grounding in the elements involved in successful teaching. The teacher needs training in psychology, principles of education, history, and philosophy of education, and curriculum construction. In addition he should have special methods courses which relate to the organization of the industrial arts laboratory and industrial arts education field in general.<sup>10</sup>

The following requirements were set up for Laboratory of Industrial Arts instructors in the Chicago schools:

1. College degree from accredited college or university.
2. Major in industrial arts education.
3. At least fifteen semester hours of education and psychology.

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<sup>9</sup>Ibid., p. 102.

<sup>10</sup>Ibid., p. 100.

4. At least ten semester hours of education or physical science.

5. Two years of teaching experiences.<sup>11</sup>

From these observations, it is indicated that Newkirk, who was director of the Bureau of Handiwork and Industrial Arts of the Chicago schools, believed that the plan was feasible and could be successfully put into action. An entirely different viewpoint is found in another study by Franklin H. Gottshall, instructor in industrial arts in the Boyerton, Pennsylvania High School.<sup>12</sup> In this investigation, Gottshall studied the need for industrial arts, defined it, stated the objectives, and outlined its organization. One of the phases of the study was the question of the type of shop to be set up, and he compared the general shop with the unit shop. General shop as used in the study was defined in this way: "The real general shop is one in which a number of types of activity are being carried on concurrently." He stated his belief that if the classes were not too large and if teaching devices were properly organized such a shop might be operated efficiently. Because his statements were pertinent to this study, they are quoted at length as follows:

The author is inclined to believe that the unit shop, or the so-called type of general shop

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<sup>11</sup>Ibid., p. 102.

<sup>12</sup>Franklin H. Gottshall, "The Comprehensive Industrial Arts Program," Industrial Arts and Vocational Magazine, XXXV (October, 1946), pp. 337-339.



in which a few closely allied types of work are carried on simultaneously, is the best.

There are a number of very good reasons why the author has held to this opinion. First, he has found that certain types of activity, such as pounding of metal, distracted the minds of those engaged in some other form of activity, such as mechanical drawing, for example. The greatest objection to the general shop, from the author's viewpoint, is that to function at all, most of the instruction must be provided by instruction sheets. In spite of all that can be claimed for instruction sheets, the industrial arts teacher of experience knows too well that a great deal of help from him is needed by students in every stage of activity, and in trying to supervise too many activities simultaneously is like having too many irons in the fire at the same time. The advance preparations that have to be made to carry on just one activity at a time are often enormous in industrial arts subjects; in fact, often as much time is spent in preparation for a class as in actual teaching. The more preparation that will be needed, else the work will have to suffer, and this holds true whether many or few are being taught.

From actual observation and personal experience the author has reached the conclusion that the many-activity general shop tends toward confusion; accomplishments are of little worth, since sufficient time is not available to make anything worth while; and considerable waste of materials and effort is involved. This is less true when older age groups are being taught, since they derive more help from instructional material. With college groups the author has found that this type of general shop works out very well, while with junior high school groups the system is very unsatisfactory. The general woodshop, or the general metal shop, and other similarly organized shops work much better.<sup>13</sup>

The above studies were made by two men experienced in the field and in the teaching of industrial arts. It is believed that the opinions of each are pertinently related to this study.

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<sup>13</sup>Ibid., p. 338.

Under the direction of the Kansas Industrial Arts and Vocational Association, Ed Davis of Kansas State College made a study of the progress of the Laboratory of Industries plan.<sup>14</sup> The study was made up from opinions of the leaders of their states at that time and included such men as Roy L. Soules, Santa Barbara, California; Earl L. Bodell, Detroit, Michigan; Elmer W. Christy, Cincinnati, Ohio; Albert McLeland, Fort Worth, Texas and J. C. Grove, East Texas State Teachers College, Commerce, Texas. The expressed opinion of the majority of the group was that the Laboratory of Industries shops are especially desirable for students of junior high school age. The advantages claimed for the plan over the unit shop were: It makes greater variety of industrial experiences available to the boys; it serves as a finding course or vocational guidance; it is more economical and interesting. The disadvantages listed were: There is difficulty in finding properly trained teachers for the Laboratory of Industries shop.

The object of this study was to bring to the Kansas City group information worth while concerning the progress of general shop in other states.

W. N. Mulvey in his "Proposed Reconstruction of Industrial Arts Courses in Secondary Schools" advocates the

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<sup>14</sup>Letter from Ed Davis to Albert McLeland, September, 1935, mimeographed, from the personal files of C. C. Davis, Denton, Texas.

Laboratory of Industries plan.<sup>15</sup> The industrial arts course should give the student experiences, but it should also contribute to his general understanding of industry and industrial organization. One of the leading courses that might be used for this period of the boy's school life is repair work about the house. This course is commonly called "home mechanics" and includes building, repair, painting, installation of electrical wiring, heating, tool and knife sharpening, tinsmithing, forging, furniture repair, simple plumbing, and elementary drawing. All of these offer a rich field of experiences, and will give the boys a better understanding of other workmen.<sup>16</sup>

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<sup>15</sup>William H. Mulvey, "Proposed Reconstruction of Industrial Courses in Secondary Schools," The Industrial Arts Magazine, XVII (April, 1928), 115-118.

<sup>16</sup>Ibid., p. 118.

## CHAPTER II

### THE LABORATORY OF INDUSTRIES PLAN OF TEACHING INDUSTRIAL ARTS AS OUTLINED BY THE STATE DEPARTMENT OF EDUCATION OF TEXAS

The specific purpose of this chapter is to present the historical background of the Laboratory of Industries plan, to give the values attributed to the plan, and to review the plan as recommended by the State Department of Education of Texas.

Historically, industrial arts in public education has had its greatest development thus far on the secondary levels. Here it has passed through two somewhat well-defined periods of professional growth and is now in the midst of the third. The first was named "manual training" by Runkle in 1877,<sup>1</sup> and the emphasis was on hand skills, chiefly in woodworking. Exercises in wood and metal, patterned after the Russian plan which was introduced in America in 1876 and consisted of exercise and joint work designed to develop skill in the use of tools. This program reverted generally to "keeping youngsters busy" on something

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<sup>1</sup>United States Department of Interior, Industrial Arts, Its Interpretation in American Schools, Bulletin (1937), Vol. 34, p. 13.

which could be displayed at the end of the year and taken home or discarded. Wood is a stubborn material in the hands of adolescents and, as most of the work was done by hand, the results were not very satisfactory until other measures and motives were adopted. The controlling, though false, assumption seemed to be that the few skills mastered would have direct vocational bearing. The American need was different from that implied for Russia.

The second period of development was named "manual training" by Bennett in 1894. While emphasis was still on skill, the philosophy was extended to include the making of both useful and well-designed articles, still principally by hand.<sup>2</sup> The Swedish Sloyd System, having for its aim "moral, mental and physical development of the pupil," was introduced in 1888, by Gustar Larsson, principal of the Sloyd Training School of Boston.<sup>3</sup> This system had distinct influence on American practice. Following this, considerable work was developed in the schools in arts and crafts.

The influence of industry brought about a third period of development, which was referred to by Richards, Russell and Bonser, and others, as "industrial arts" (1906-10).<sup>4</sup>

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<sup>2</sup>Ibid., p. 13.

<sup>3</sup>Erhard Wendt, "A Brief History of Industrial Arts and Vocational Education," Industrial Arts and Vocational Education Magazine, XXXV (April, 1946), 151-154.

<sup>4</sup>Ibid., p. 154.

The feeling was that all that was good should be retained but certain new concepts should dominate. One of the first ideas along with the origin of the junior high school in the second decade of the present century was to provide for broad orientation or exploration. Industrial arts began to call for a diversity rather than a specialization of skills. Many materials were used along with basic techniques employed by industry. Out of this grew the Laboratory of Industry plan.

Bonser's early definition--Industrial Arts is a study of the changes made by man in the forms of materials to increase their values, and the problems of life related to these changes--was but a modern interpretation of general education. Laboratory of Industries plan represents an enriched and broadened conception. No school making any pretention of being up-to-date teaches "manual training" any more, and manual arts is giving way to industrial arts in the more modern and progressive school. Until quite recently most school shops were unit shops, but within the past twenty years the general shop and Laboratory of Industries shops have grown in popularity, especially in the small schools.<sup>5</sup>

Broadly speaking, the Laboratory of Industries plan is to provide the pupils with a form of general and non-vocational

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<sup>5</sup>Joseph C. Park, "What is General Shop?" Industrial Education Magazine (May, 1937), p. 30.

education, consisting of knowledge, understanding and insights, habits and skills, ideals and appreciation having to do with tools, materials, processes, products, and the vocational conditions and requirements of the arts industries. These results are achieved through the planning, construction, finish and evaluation of useful projects in shops and laboratories, appropriately equipped, organized and staffed, and through reading, discussions, visits on observation trips, investigations, reports, films, and similar activities of interest to youth.<sup>6</sup>

More specifically the special contributions which the Laboratory of Industries plan gives are:<sup>7</sup>

1. Exploratory and Try-out Opportunities.

Few courses can compare with the Industrial Arts Laboratory in this respect. In a properly conducted shop, the pupil is confronted with real problems and an everlasting challenge to do. By wholehearted participation in the various activities, the pupil discovers his aptitudes, capacities, likes and dislikes, and becomes orientated to many materials and things which touch his daily life.

2. Consumer Knowledge and Appreciation.

This means the ability to select wisely, care for, and use properly the various products of industry. The ability to distinguish between the genuine values and inferior substitutes on the market is imperative for economic success and good taste. Experience in the design, construction, finish, and evaluation of useful materials, processes and the workmanship of commercial products will do much to make the consumer make wise selections.

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<sup>6</sup>Purpose of Industrial Arts (Author not given), pp. 1-3.

<sup>7</sup>Ibid., pp. 2-3.

### 3. Active and Enduring Interest in Industrial Affairs.

Through shop experiences the pupil acquires an understanding and insight into how various things are made, the source of the raw materials, methods of processing them, their working qualities and chief uses.

### 4. Avocational and Leisure Time Interests and Ability.

Children are no longer needed or employed in the home as they once were; thus great numbers of young people are thrown back on the school or on the streets. Whether this added leisure proves to be a blessing or a curse depends altogether on what use is made of it. Unquestionably, education for leisure time activities is more urgent than education for work. The aesthetic interest and creative abilities developed in the school shop should find expression in enduring hobbies and avocations both during and after school life.

### 5. Skill in the Use of Common Tools.

He who can use tools skillfully, and plan, is master over all material things. Skills developed in the school shop are of permanent value to the individual in his vocational and leisure time activities in making countless repairs about the home, and in caring for and adjusting the mechanical devices with and by which the modern world operates.

### 6. Orderly Methods and Procedures of Work.

In the properly conducted industrial arts shops, the pupil is required first, to think through and plan his project. When the plan is completed and approved, the pupil does his job according to it. Orderly methods and procedures of work become established as habits and generalized meanings, in which form they reach out into other activities.

### 7. Desirable Personal-Social Traits.

These may be defined in terms of moral, mental, social, aesthetic, and physical qualities. An industrial arts laboratory offers an atmosphere of freedom and life likeness, and problems that interest and challenge the pupils. When the teacher makes a development of these traits (objects of thoughts or conscious objectives) in his teaching, the shop assumes an important role in character building.

Many of these values could be attributed to the single-activity, or unit shop, but the objectives of the Laboratory



of Industries plan envelop the field of general education and harmonize with the objectives of elementary school, junior high school, and the senior high school.

The Laboratory of Industries plan of industrial arts, as proposed by the State of Texas, is based on the following philosophies and objectives for industrial arts.<sup>8</sup>

1. Giving the pupil practical experience with construction materials and mechanical activities of this industrial period which will be useful in home, avocational and vocational life.

2. Developing the habit of careful planning and methodical procedures in pursuing the manipulation and mental phase of industrial life.

3. Providing opportunity for developing knowledge related to tools, materials, processes, operations, and other industrial arts information useful to home, avocational and vocational life.

4. Providing additional opportunities for guidances and the development of social habits and mental attitudes.

#### Objectives

1. To help pupils to meet as effectively as possible life situations related to manufacturing, construction, and mechanical service industries of America by giving them controlled practical experiences with construction and materials.

2. To develop good habits in thinking and doing regarding tools, materials, processes, and operations for the purpose of making the pupils more independent in life.

3. To develop the individual in harmony with his fundamental needs and best interests.

The Laboratory of Industrial Arts activities of the Home and Vocational Arts Core Area of the revised Texas course of study, suitable for two years between the sixth

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<sup>8</sup>Texas State Department of Education, Industrial Arts Program (1938), Bulletin No. 389, p. 10.

and the ninth years, have as their objectives those stated below.

Schools of not over 150 boys in years seven to twelve inclusive probably cannot afford more than one full-time teacher of industrial arts. In such schools, all units of this work may be taught in one laboratory suitably equipped for the industries to be studied. In larger schools there should be a sufficient number of laboratories and teachers to accommodate the pupils desiring this work; each laboratory will then be equipped for specific or correlated industries according to a number of laboratories provided and the number of industries to be studied.

The Laboratory of Industries is a concept, tryout, or exploratory course in more than one industry, preferably four. Provisions are to be made to give experience, to achieve certain skills, to acquire industrial arts knowledge, and to interpret associated occupational information regarding the materials and products of given industries.

The Laboratory of Industries with its varied activities and emphasis on the learning side, as well as on the doing side, fulfills the requirements of industrial arts education for the modern boy or girl. For any assigned task the individual must "know" before he is able to "do." In purchasing, using, and maintaining the products of industry, he must know and be able to make the most of other materials and tools of industry instead of wood alone.

In the Laboratory of Industries courses, there may be a large range of industries represented through short unit courses dealing with drawing, woodwork, automotive problems, electricity, metals, printing, ceramics, and other activities from which the pupil may develop useful basic skills and knowledge. The pupil may experience as many activities as the school can offer, depending upon the judgment of the supervising officer and upon the preparation, interest, and energy of the teacher. The pupil, while making a selected project, learns and develops, among other things:

1. The basic skills in each selected activity that are useful in maintaining the products of industry used in the home.

2. Some definite ideas about how various products of each respective industry studied are produced, the chief characteristics of the industry, the occupations associated with the industry, and other significant knowledge.

3. Certain facts concerning the selecting, purchasing, and using of the products of industry.

4. A degree of social efficiency through participation in a pupil controlled organization, which expected to accrue from experiences as student foreman, shop superintendent, safety engineer, and other responsibilities of social nature.<sup>9</sup>

The course does not give training in a definite vocation, nor does it aim to give extensive pre-vocational training as such; but, as one of the industrial arts courses, its ultimate objectives may be summarized as follows:

Some experiences in the basic tool processes and operations, industrial intelligence, cultivation of individual

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<sup>9</sup>Ibid., p. 16.

talents and abilities, consumer knowledge, promotion of avocational interests or hobbies, appreciation of good craftsmanship, guidance into or out of the represented fields of industry, and others.<sup>10</sup>

The Laboratory of Industries has many advantages, such as: economy of equipment, enrichment of shop content, greater

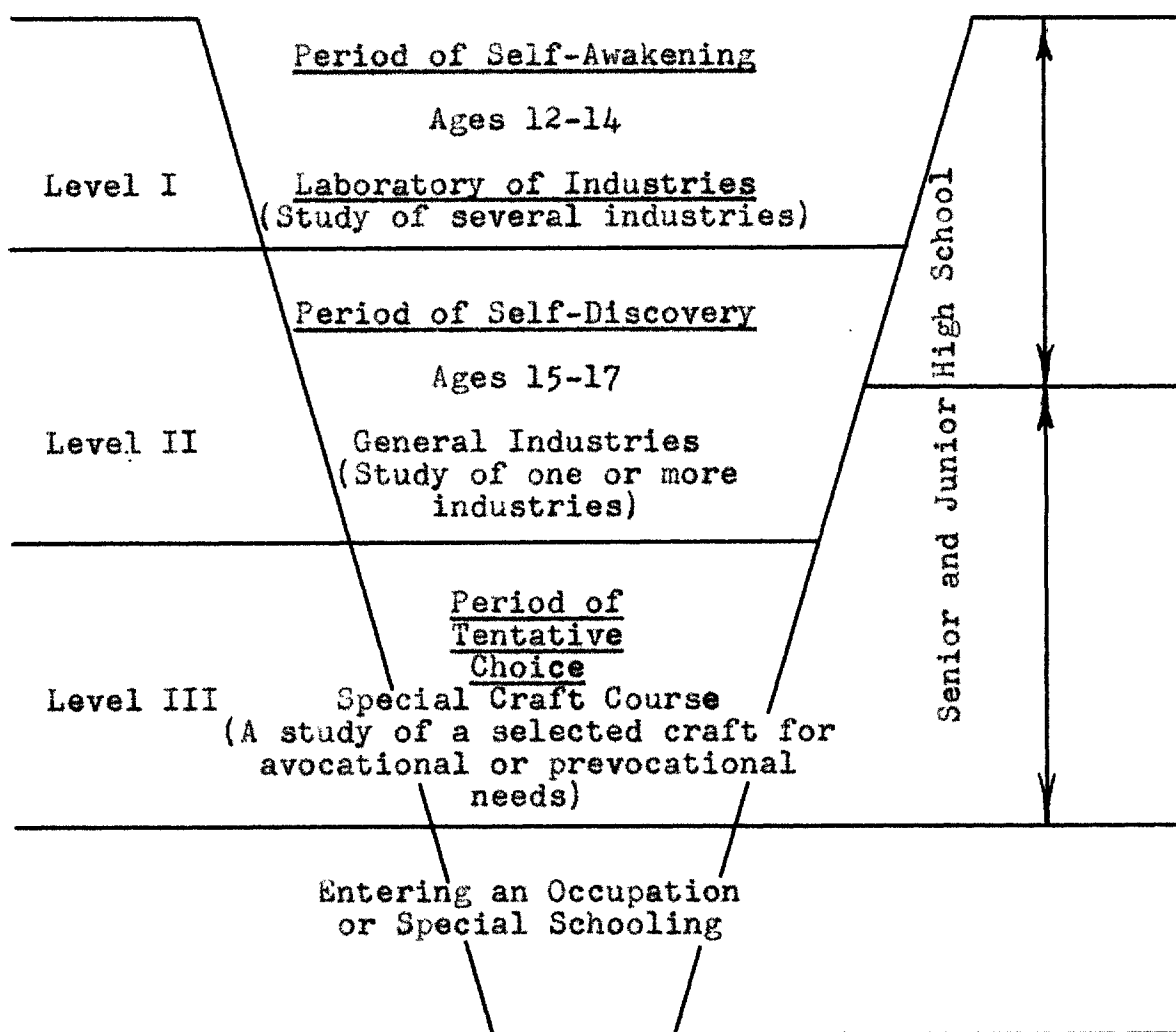


Fig. 1.--Chart showing the three levels of industrial arts and their proposed grade placement.

<sup>10</sup>Ibid., p. 17.

exploration, greater functional value, greater carry-over value, and a wider choice of fields. The course provides information concerning the source of raw materials and their use in the manufacture of usable products.

A pupil's entry from elementary into junior high school industrial arts program begins with a broad general course made up of "several industries" called "Laboratory of Industries." As he selects to continue additional industrial arts courses in the junior or senior high school, the courses become more specialized for individual needs and interests as illustrated in the chart on page 21.<sup>11</sup>

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<sup>11</sup>Ibid., p. 11.

## CHAPTER III

### PRESENTATION OF DATA FROM INSTRUCTORS USING THE LABORATORY OF INDUSTRIES PLAN IN TEACHING INDUSTRIAL ARTS

In order to present a true study of the industrial arts program as it is being carried out in the seventy-five schools included in this survey, the replies were separated into two categories: First, the instructors using the Laboratory of Industries plan, and second, the instructors using general shop, unit shop and other plans.

Of the seventy-five replies received, twenty-six, or approximately 35 per cent, of the instructors are using the Laboratory of Industries plan. The data from the replies of these twenty-six instructors will be used in this chapter.

Table 1, page 24, shows the degrees held by instructors using the Laboratory of Industries plan of teaching industrial arts.

As shown in Table 1, page 24, nineteen, or 73.1 per cent, of the teachers hold Bachelor of Science or Bachelor of Arts degrees. Six, or 23.1 per cent, hold Master of Science or Master of Arts degrees, and one has no college degree.

TABLE 1

DEGREES HELD BY INSTRUCTORS USING THE LABORATORY  
OF INDUSTRIES PLAN OF TEACHING  
INDUSTRIAL ARTS IN TEXAS

Degree Held by Teachers	Number	Percentage
B.S. or B.A.	19	73.1
M.S. or M.A.	6	23.1
No degree	1	3.8

Table 2, below, shows the major fields studied by instructors of Laboratories of Industries plan of teaching industrial arts in Texas.

TABLE 2

MAJOR FIELD STUDIED BY INSTRUCTORS OF LABORATORIES  
OF INDUSTRIES PLAN OF TEACHING  
INDUSTRIAL ARTS IN TEXAS

Major Fields Studied	Number	Percentage
Industrial arts	22	86
Education	2	7
School administration	2	7

The Laboratory of Industries instructor needs to have studied the entire industrial arts field extensively. It can readily be seen in Table 2 that 86 per cent of the instructors did have intensive technical training in the completion of undergraduate work in industrial arts. Seven

per cent had school administration as their major field of study, and 7 per cent had education as their major field.

In Table 3, below, the distribution of semester hours in industrial arts of Laboratory of Industries instructors is shown:

TABLE 3  
DISTRIBUTION OF SEMESTER HOURS IN INDUSTRIAL ARTS  
COLLEGE TRAINING OF THE TWENTY-SIX LABORATORY  
OF INDUSTRIES INSTRUCTORS

Number of Teachers	Per Cent	Number of Semester Hours in Industrial Arts
1	3.8	15 to 24
1	3.8	24 to 36
1	3.8	36 to 45
6	23.1	45 to 56
8	30.7	56 to 66
4	15.3	66 to 75
1	3.8	75 to 100
1	3.8	Over 100

These twenty-six instructors were asked their number of semester hours in industrial arts. Table 3, above, shows that one, or 3.8 per cent, reported having fifteen to twenty-four semester hours in industrial arts. One, or 3.8 per cent had twenty-four to thirty-six semester hours in industrial arts, and one, or 3.8 per cent, had thirty-six to forty-five



semester hours in industrial arts. Six, or 23.1 per cent, of the instructors reported having forty-five to fifty-six semester hours in industrial arts; and eight, or 30.7 per cent, of the instructors reported having fifty-six to sixty-six semester hours in industrial arts. Four, or 15.3 per cent, of the instructors stated that they had sixty-six to seventy-five semester hours in industrial arts; and one, or 3.8 per cent, of the instructors reported having seventy-five to one hundred semester hours in industrial arts. One, or 3.8 per cent, reported having over one hundred semester hours in industrial arts.

Table 4, page 27, shows the distribution of years of teaching experience of the instructors using Laboratory of Industries plan. These instructors were asked to indicate the number of years of experience each had had. As shown in Table 4, one, or 3.8 per cent, had one year experience; and two, or 7.4 per cent, had two years of experience. Four, or 15.3 per cent, had three years of experience; three, or 11.5 per cent, had four years of experience; and three, or 11.5 per cent, had five years of experience. Three, or 11.5 per cent, had six years of experience; and three, or 11.5 per cent, had had seven years of experience. One, or 3.8 per cent, had eight years of experience; one, or 3.8 per cent, had ten years of experience; and two, or 7.4 per cent, had twelve years of experience. One, or

3.8 per cent, had thirteen years of experience; and one, or 3.8 per cent, had over twenty years of experience.

TABLE 4  
DISTRIBUTION OF YEARS OF EXPERIENCE IN TEACHING  
INDUSTRIAL ARTS OF THE TWENTY-SIX INSTRUCTORS  
USING THE LABORATORY OF INDUSTRIES PLAN

Number of Instructors	Per Cent	Years of Experience in Teaching Industrial Arts
1	3.8	1
2	7.4	2
4	15.3	3
3	11.5	4
3	11.5	5
3	11.5	6
3	11.5	7
1	3.8	8
1	3.8	10
2	7.4	11
1	3.8	12
1	3.8	13
1	3.8	Over 20

Information was sought as to the size of the shops being used in the Laboratories of Industries. The results are shown in Table 5, page 28. Of the twenty-six instructors who replied, four had shops of 1,250 square feet, four had shops

TABLE 5

SIZE OF SHOP OR ROOMS USED BY THE LABORATORY  
OF INDUSTRIES INSTRUCTORS IN TEXAS

Size in Square Feet	Number of Shops
0 to 500 ft. . . . .	1
500 to 750 ft. . . . .	2
750 to 1000 ft. . . . .	2
1000 to 1250 ft. . . . .	4
1250 to 1500 ft. . . . .	3
1500 to 1750 ft. . . . .	4
1750 to 2000 ft. . . . .	3
2000 to 2500 ft. . . . .	3
2500 to 3000 ft. . . . .	0
3000 to 4000 ft. . . . .	4

of 1,750 square feet and four had shops of over 3,000 square feet. Three had shops of over 1,500 square feet, three had shops of 2,000 square feet, and three had shops of 2,500 square feet. Two had shops of 750 square feet and two had shops of 1,000 square feet. One had a shop of 500 square feet and one had a shop of 3,000 square feet.

In Table 6, page 29, the value of tools and machinery of the shops using the Laboratory of Industry plan of industrial arts is shown. Of the twenty-six schools reporting, the majority, or 23.1 per cent, showed value of tools and machinery totaling 2,000 dollars. Eleven and five-tenths per cent showed value of tools and machinery totaling 5,000

TABLE 6

THE VALUE OF TOOLS AND MACHINERY OF THE SHOPS  
 USING THE LABORATORY OF INDUSTRIES PLAN OF  
 INDUSTRIAL ARTS IN TEXAS

Value of Tools and Machinery	Number of Shops
.00 to \$500.00 . . . . .	2
\$500.00 to \$750.00 . . . . .	2
\$750.00 to \$1,000.00 . . . . .	2
\$1,000.00 to \$1,500.00 . . . . .	1
\$1,500.00 to \$2,000.00 . . . . .	6
\$2,000.00 to \$3,000.00 . . . . .	3
\$3,000.00 to \$5,000.00 . . . . .	1
\$5,000.00 to \$7,500.00 . . . . .	4
\$7,500.00 to \$10,000.00. . . . .	3

dollars, 15.3 per cent showed value of tools and machinery totaling 7,000 dollars, and 11.5 per cent showed value of tools and machinery totaling 10,000 dollars. Seven and four-tenths per cent showed value of tools and machinery totaling 500 dollars, 7.4 per cent showed a value of tools and machinery totaling 750 dollars, and 7.4 per cent showed value of tools and machinery totaling 1,000 dollars. Three and eight-tenths per cent showed value of tools and machinery totaling 200 dollars, 3.8 per cent showed value of tools and machinery totaling 1,500 dollars, and 3.8 per cent showed value of tools and machinery totaling 5,000 dollars.

The cost to individual Laboratory of Industries student per semester for materials is shown in Table 7, below.

TABLE 7

THE COST TO INDIVIDUAL LABORATORY OF INDUSTRIES  
STUDENT PER SEMESTER FOR MATERIALS

Cost to Student Per Semester	Number of Instructors
\$ .50 to \$1.00 . . . . .	0
\$1.00 to \$1.50 . . . . .	2
\$1.50 to \$2.00 . . . . .	2
\$2.00 to \$2.50 . . . . .	9
\$2.50 to \$3.00 . . . . .	3
\$3.00 to \$3.50 . . . . .	1
\$3.50 to \$4.00 . . . . .	4
\$4.00 to \$5.00 . . . . .	2
\$5.00 to \$7.50 . . . . .	2
\$7.50 to \$10.00 . . . . .	1

When asked the approximate cost per student per semester, the instructors' replies varied from one dollar to six dollars, as shown in Table 7, above. The majority of instructors, which was nine, showed a cost of two dollars per student. Four instructors showed a cost of three dollars and fifty cents per student, and three showed a cost of two dollars and fifty cents per student. Two showed a cost of one dollar; two showed a cost of one dollar and fifty cents; two showed a cost of four dollars; and two showed a cost of

five dollars. One showed a cost of three dollars, and one showed a cost of six dollars.

In order to separate the replies into the two categories, that is, the instructors using the Laboratory of Industries plan and the instructors using general shop, unit shop and other plans, the question was asked, "What plan of industrial arts is offered in your school?" Under this was listed general shop plan, unit shop plan, and Laboratories of Industries plan with a short description of each. Also was listed "other plans you may be using." Forty-nine, or approximately 65.4 per cent of the instructors, checked general shop, unit shop, or other shop plans. Twenty-six, or approximately 34.6 per cent, checked Laboratory of Industries plan.

Table 8, below, shows the different state wide plans for teaching industrial arts in Texas as recommended by the Laboratory of Industries instructors.

TABLE 8

DIFFERENT STATE WIDE PLANS FOR TEACHING INDUSTRIAL  
ARTS IN TEXAS AS RECOMMENDED BY THE LABORATORY  
OF INDUSTRIES INSTRUCTORS

Plans Recommended	Number of Teachers
General shop plan . . . . .	6
Unit shop plan . . . . .	12
Laboratory of Industries plan . . . . .	6
Other plans . . . . .	1
No plan recommended . . . . .	1

The question was asked, "What shop plan would you recommend for a state wide plan?" Table 8, page 31, shows that twelve, or 46.1 per cent, of the instructors replied that they recommended the general shop plan. Six, or 23.1 per cent, of the instructors recommended the unit shop plan, and six, or 23.1 per cent, of the instructors recommended that Laboratory of Industries be used as a state wide plan. Two, or 7.4 per cent, recommended other shop plans. One of these recommended that the Laboratory of Industries plan be used with not more than two units or phases of work being carried on at the same time. The other instructor recommended that the locality of the shop should determine entirely the nature of the courses presented.

The subjects taught by the Laboratory of Industries instructors are shown in Table 9, below.

TABLE 9  
SUBJECTS TAUGHT BY THE LABORATORY OF INDUSTRIES INSTRUCTORS

Subject Taught	Number of Schools	Percentage
Woodwork	26	100
Metalwork	24	92.3
Drawing	22	84.6
Electricity	16	61.5
Crafts	3	11.5
Auto mechanics	2	7.4
Plastics	1	3.8

Table 9, page 32, gives data on the different phases of industrial arts being taught in the Laboratory of Industries. The majority of the shops offered three phases: woodwork, metalwork, and drawing, while part of them offered the combination of woodwork, metalwork, drawing and electricity. Twenty-six, or 100 per cent, of the shops offered woodwork. Twenty-four, or 92.3 per cent offered metalwork; twenty-two, or 84.6 per cent, teach drawing; and sixteen, or 61.5 per cent, teach electricity. Three, or 11.5 per cent, of the instructors stated that they offer auto mechanics; and one, or 3.8 per cent, offers plastics in the Laboratory of Industries.

Table 10, page 34, shows the number of activities being carried on and the number of activities recommended to be carried on by the instructors using the Laboratories of Industries plan. The questions, "How many activities do you carry on in the same class at the same time?" and "How many activities do you recommend to be carried on at the same time?" were asked. As shown in Table 10, page 34, thirteen, or 50 per cent, were teaching three activities; and eight, or 31 per cent, were teaching four activities at the same time. Five, or 19.2 per cent, were carrying on two activities at the same time. Fourteen, or 53.8 per cent, preferred to carry only one activity at the same time; and ten, or 38.6 per cent, recommended that two activities be taught at the same time. Two, or 7.4 per cent, recommended that



TABLE 10

DATA SHOWING NUMBER OF ACTIVITIES BEING CARRIED ON  
AND THE NUMBER OF ACTIVITIES RECOMMENDED TO  
BE CARRIED ON BY THE TWENTY-SIX  
INSTRUCTORS TEACHING THE  
LABORATORY OF INDUSTRIES

Number of Activities Carried on	Number of Teachers	Per Cent	Number of Activities Recommended	Number of Teachers	Per Cent
1	None	0.0	1	14	53.8
2	5	19.2	2	10	38.6
3	13	50.0	3	2	7.4
4	8	31.8	4	None	0.0

three activities be carried on at the same time. None recommended that four phases of industrial arts be taught at the same time.

Size of classes being taught and the size of classes recommended by instructors using the Laboratory of Industries plan of teaching industrial arts are shown in Table 11, page 35.

The greatest number of instructors, which was nine or 34.5 per cent, had classes of 30 students. The next highest number, which was four, or 15.3 per cent, had twenty-six students. Three, or 11.5 per cent, of the instructors had thirty-two enrolled in each class. Two, or 7.4 per cent, had sixteen students; two, or 7.4 per cent had twenty-two

TABLE 11

DATA SHOWING THE SIZE OF CLASSES BEING TAUGHT AND THE  
 SIZE OF CLASSES RECOMMENDED BY INSTRUCTORS  
 USING THE LABORATORY OF INDUSTRIES PLAN

Size of Class Being Taught	Number of Teachers	Per Cent	Size of Class Recommended	Number of Teachers	Per Cent
16	2	7.4	16	4	15.3
18	1	3.8	18	1	3.8
20	1	3.8	20	6	23.1
22	2	7.4	22	4	15.3
24	1	3.8	24	8	30.7
26	4	15.3	26	2	7.4
28	1	3.8	28	None	0
30	9	34.6	30	1	3.8
32	3	11.5	32	None	0
34	None	0	34	None	0
36	2	7.4	36	None	0

students; and two, or 7.4 per cent, had thirty-six students. One, or 3.8 per cent, had a class size of eighteen students; and one, or 3.8 per cent, had a class size of twenty students. One, or 3.8 per cent, had twenty-four students; and one, or 3.8 per cent, had twenty-eight students. Four instructors, or 15.3 per cent, recommended that the class size be limited to sixteen students. One, or 3.8 per cent, recommended a class size of eighteen students. Six, or 23.1 per cent, of

the instructors recommended twenty students as the ideal class size; four, or 15.3 per cent, of the instructors recommended twenty-two students as the class size; and eight, or 30.7 per cent, of the instructors recommended twenty-four students as the most suitable class size. Two, or 7.4 per cent, recommended twenty-eight students as the size of a class; and one, or 3.8 per cent, recommended thirty students as the class size.

In Table 12, below, the percentage of instructors showing difficulty in teaching Laboratory of Industries plan is shown.

TABLE 12  
PERCENTAGE OF INSTRUCTORS SHOWING DIFFICULTY IN  
TEACHING LABORATORY OF INDUSTRIES PLAN

Question	Yes	Per Cent	No	Per Cent
Do you find it difficult to teach the Laboratory of Industries plan of industrial arts?	19	73	7	27

The question was asked, "Do you find it difficult to teach the Laboratory of Industries plan?" As seen in Table 12, this page, nineteen, or 73 per cent, replied "Yes," and only seven, or 27 per cent, replied "No."

Difficulties encountered in teaching the Laboratory of Industries by the instructors are shown in Table 13, page 37.

TABLE 13

DIFFICULTIES ENCOUNTERED IN TEACHING THE LABORATORY  
OF INDUSTRIES BY THE INSTRUCTORS

Difficulties Listed	Number of Teachers	Percentage
Difficult to teach	2	7.4
Lack of time for each phase	6	23.1
Disturbance from one activity while teaching another	1	3.8
Controlling one activity while beginning another	1	3.8
Classes too large	2	7.4
Lack of individual instruction	5	19.2
Lack of textbook	2	7.4
Inability of instructor	2	7.4
Inability to keep students busy	2	7.4
No reason	3	11.5

When asked, "What is the main difficulty you find in teaching the Laboratory of Industries plan?" twenty-three of the instructors gave some difficulties encountered. These can be readily seen in Table 13, above. Two, or 7.4 per cent, stated that the plan was difficult to teach. Six, or 23.1 per cent, reported that they lacked time to teach each phase as it should be done. One, or 3.8 per cent, said disturbance from one activity while he was trying to teach another activity was his greatest difficulty; and one, or

3.8 per cent, said that his greatest difficulty in teaching was in controlling one activity while beginning another. Five, or 19.2 per cent, gave lack of individual instruction as a main difficulty; and two, or 7.4 per cent, stated that over-crowded classes was their main difficulty. Two, or 7.4 per cent, reported that the lack of textbooks was their difficulty; and two, or 7.4 per cent, gave inability or lack of proper training of the instructor as the main difficulty. Two, or 7.4 per cent, stated that they were unable to keep students busy; and three, or 11.5 per cent, did not list a difficulty.

Table 14, page 39, shows the years of experience in teaching the Laboratory of Industries plan of the instructors using the plan. It has been shown that these twenty-six instructors were comparatively new in the field of teaching industrial arts. These instructors were also asked to give their years of experience in teaching the Laboratory of Industries plan. Table 14, page 39, reveals that three, or 11.5 per cent, of these instructors had one year of experience in teaching the Laboratory of Industries method. Five, or 19.2 per cent, had two years experience; and four, or 15.3 per cent, had three years of experience in teaching the Laboratory of Industries plan. Three, or 11.5 per cent, had four years experience; four, or 15.3 per cent, had five years experience; and two, or 7.4 per cent, had six years of experience. Two, or 7.4 per cent, had

seven years of experience; two, or 7.4 per cent, had eight years experience; and one, or 3.8 per cent, had over ten years of experience in teaching the Laboratory of Industries plan.

TABLE 14

DISTRIBUTION OF YEARS OF EXPERIENCE IN TEACHING  
THE LABORATORY OF INDUSTRIES PLAN OF THE  
INSTRUCTORS NOW USING THE PLAN

Number of Instructors	Per Cent	Number of Years Experience in Teaching the Laboratory of Industry
3	11.5	1
5	19.2	2
4	15.3	3
3	11.5	4
4	15.3	5
2	7.4	6
2	7.4	7
2	7.4	8
1	3.8	Over 10

## CHAPTER IV

### PRESENTATION OF DATA FROM INSTRUCTORS WHO USE EITHER UNIT SHOP, GENERAL SHOP OR OTHER METHODS IN TEACHING INDUSTRIAL ARTS

The data for this chapter were obtained from the replies of the forty-nine instructors answering the questionnaires who were using either unit shop, general shop or other methods in teaching industrial arts.

Table 15, below, shows the degrees held by the instructors of general shop, unit shop or other methods.

TABLE 15  
DISTRIBUTION OF DEGREES HELD BY INSTRUCTORS OF GENERAL  
SHOP, UNIT SHOP, OR OTHER SHOP PLANS

Degree	Number of Degreed	Per Cent
B.S. or B.A.	36	73.5
M.S. or M.A.	12	24.5
No degree	1	2.0

Thirty-six, or 73.5 per cent of these forty-nine instructors have a Bachelor of Arts or Bachelor of Science degree. Twelve, or 24.5 per cent, have a Master of Arts or Master of Science

degree. One, or 2 per cent, stated that he did not have a college degree.

The major field of the instructors using general shop, unit shop, or other plans is shown in Table 16, below.

TABLE 16  
MAJOR FIELD OF THE INSTRUCTORS USING THE GENERAL SHOP,  
UNIT SHOP OR OTHER SHOP PLANS

Major	Number of Instructors	Per Cent
Industrial arts	44	89.8
Education	1	2.0
English	1	2.0
History	1	2.0
Mathematics	1	2.0
School administration	1	2.0

The data presented in Table 16, this page, reveal that forty-four, or 89.8 per cent, of the instructors using unit shop plan, general shop plan and other plans majored in industrial arts. One, or 2 per cent, majored in education; one, or 2 per cent, majored in English; and one, or 2 per cent, majored in history. One, or 2 per cent, majored in mathematics, and one, or 2 per cent, majored in school administration.



Table 17, below, shows the number of semester hours of instructors using general shop, unit shop or other shop plans.

TABLE 17  
NUMBER OF SEMESTER HOURS OF INSTRUCTORS USING GENERAL SHOP, UNIT SHOP, OR OTHER SHOP PLANS

Number of Instructors	Per Cent	Number of Semester Hours
5	10.2	24
11	22.4	36
7	14.3	45
14	28.5	54
8	16.3	56
2	4.1	75
2	4.1	Over 100

Five, or 10.2 per cent, have as many as twenty-four semester hours; eleven, or 22.4 per cent, have thirty-six semester hours; and seven, or 14.3 per cent, have forty-five semester hours in industrial arts. Fourteen, or 28.5 per cent, have fifty-four semester hours; and eight, or 16.3 per cent, have sixty-six semester hours in industrial arts. Two, or 4.1 per cent, have seventy-five semester hours; and two, or 4.1 per cent, have over 100 hours in industrial arts.

Table 18, page 43, shows the years of experience in teaching industrial arts of the instructors using general

shop, unit shop, or other plans of teaching industrial arts. These instructors were asked to give their number of years

TABLE 18

DISTRIBUTION OF YEARS OF EXPERIENCE IN TEACHING  
INDUSTRIAL ARTS OF THE INSTRUCTORS USING  
GENERAL SHOP, UNIT SHOP, OR OTHER PLANS

Number of Instructors	Per Cent	Number of Years of Experience
4	8.2	1
10	20.4	2
2	4.1	3
1	2.0	4
3	6.1	5
1	2.0	6
1	2.0	7
5	10.2	8
1	2.0	9
1	2.0	10
2	4.1	11
3	6.1	12
2	4.1	13
2	4.1	14
1	2.0	16
1	2.0	18
1	2.0	20
8	16.3	Over 20

of experience in teaching industrial arts. As shown in Table 18, page 43, four, or 8.2 per cent, had one year of experience; and ten, or 20.4 per cent, had two years of experience in teaching industrial arts. Two, or 4.1 per cent, had three years of experience; one, or 2.0 per cent, had four years of experience; and three, or 6.1 per cent, had five years of experience in teaching industrial arts. One, or 2.0 per cent, had six years of experience; and one, or 2.0 per cent, had seven years of experience. Five, or 10.2 per cent, had eight years of experience; one, or 2.0 per cent had nine years of experience; and one, or 2.0 per cent, had ten years of experience in teaching industrial arts. Two, or 4.1 per cent, had eleven years of experience; three, or 6.1 per cent, had twelve years of experience; and two, or 4.1 per cent, had thirteen years of experience. Two, or 4.1 per cent, had fourteen years of experience; and one, or 2.0 per cent, had sixteen years of teaching experience. One, or 2.0 per cent, had eighteen years of experience; and one, or 2.0 per cent, had twenty years of experience. Eight, or 16.3 per cent, had over twenty years of experience in teaching industrial arts.

The size of shops of the instructors using the general shop, unit shop, and other shop plans is shown in Table 19, page 45.

The data presented in Table 19, page 45, show that the size of the shops used by the forty-nine instructors in unit

TABLE 19  
 SIZE OF SHOPS OF THE INSTRUCTORS USING THE GENERAL  
 SHOP, UNIT SHOP, AND OTHER PLANS

Number of Shops	Size of Shop in Square Feet	Per Cent
1	500	2.0
1	750	2.0
5	1000	10.2
6	1250	12.3
7	1500	14.3
3	1750	6.1
8	2000	16.3
7	2500	14.3
3	3000	6.1
8	Over 3000	16.3

and general shop varies from 500 square feet to 3,000 square feet and over. One, or 2 per cent, has a shop of 500 square feet; and one, or 2 per cent, has a shop of 750 square feet. Five, or 10.2 per cent, have shops of 1,000 square feet; and six, or 12.3 per cent, have shops of 1,250 square feet. Seven, or 14.3 per cent, have shops of 1,500 square feet; three, or 6.1 per cent, have shops of 1,750 square feet; and eight, or 16.3 per cent, have shops of 2,000 square feet. Seven, or 14.3 per cent, have shops of 2,500 square feet, and three, or 6.1 per cent, have shops of 3,000 square

feet. Eight, or 16.3 per cent, have shops over 3,000 square feet in size. This was an average size of 1,653 square feet per each shop.

Table 20, below, shows the value of tools and machinery of the instructors using the general shop, unit shop, or other shop plans of teaching industrial arts.

TABLE 20  
VALUE OF TOOLS AND MACHINERY OF THE INSTRUCTORS  
USING THE GENERAL SHOP, UNIT SHOP,  
OR OTHER SHOP PLANS

Number of Shops :	Per Cent	Value of Tools and Machinery
1	2.0	\$ 200.00
2	4.1	500.00
1	2.0	750.00
3	6.1	1000.00
7	14.3	1500.00
5	10.2	2000.00
8	16.3	3000.00
9	18.3	5000.00
6	12.3	7500.00
7	14.3	10000.00

Information was sought as to the value of tools and machinery being used in the general, unit or other plan of shop. As seen in Table 20, this page, one, or 2 per cent,

reported having tools and machinery valued at 200 dollars. Two, or 4.1 per cent, reported having tools and machinery valued at 500 dollars; and one, or 2 per cent, reported having machinery valued at 750 dollars. Three, or 6.1 per cent, reported having tools and machinery valued at 1,000 dollars; and seven, or 14.3 per cent, reported having tools and machinery valued at 2,000 dollars. Eight, or 16.3 per cent, reported having tools and machinery valued at 3,000 dollars; and nine, or 18.3 per cent, reported having tools and machinery valued at 5,000 dollars. Six, or 12.3 per cent, reported having tools and machinery valued at 7,500 dollars; and seven, or 14.3 per cent, reported having tools and machinery valued at 10,000 dollars.

Approximate cost for materials to student per semester using the general shop, unit shop, or other shop plans is shown in Table 21, page 48. As shown in this table, the approximate cost to the student per semester ranged from one dollar to six dollars and over. Four showed the cost of one dollar per student, and one showed the cost of one dollar and fifty cents per student. Six gave the cost as two dollars, four gave the cost as two dollars and fifty cents, and four gave the cost as three dollars per student. Three showed the cost of three dollars and fifty cents per semester for each student, and eight showed a cost of four dollars per semester for each student. Nine gave the cost of five dollars per student, and three gave the cost of six dollars per student.

Seven reported a cost of over six dollars per semester for each student.

TABLE 21

APPROXIMATE COST FOR MATERIALS TO STUDENT PER SEMESTER  
USING THE GENERAL SHOP, UNIT SHOP,  
OR OTHER SHOP PLANS

Cost	Number of Students
\$1.00 to \$1.50 . . . . .	4
\$1.50 to \$2.00 . . . . .	1
\$2.00 to \$2.50 . . . . .	6
\$2.50 to \$3.00 . . . . .	4
\$3.00 to \$3.50 . . . . .	4
\$3.50 to \$4.00 . . . . .	3
\$4.00 to \$5.00 . . . . .	8
\$5.00 to \$6.00 . . . . .	9
\$6.00 to \$7.00 . . . . .	3
Over \$7.00 . . . . .	7

Table 22, page 49, shows the plans offered in the schools of the instructors using general shop, unit shop, or other shop plans. The question was asked, "What plan of industrial arts is offered in your school?" Under this question was listed general shop plan, unit shop plan, and other plans you may be using. Data in Table 22, page 49, show that nineteen, or 38.7 per cent, stated that the general shop was being used in their school. Twenty-one, or 42.8 per cent, were using the unit shop plan. Seven,

TABLE 22

PLANS OFFERED IN THE SCHOOLS OF THE INSTRUCTORS USING  
THE GENERAL SHOP, UNIT SHOP, OR OTHER SHOP PLANS

Plans Offered	Per Cent	Number of Instructors
General shop plan	38.7	19
Unit shop plan	42.8	21
General and unit shop plan	14.3	7
Other plans	4.1	2

or 14.3 per cent, replied that both general and unit shop were used in their schools. Two, or 4.1 per cent, stated that other plans were being used. These other plans were described as a carpentry and carpentry planning shop, and a repair shop.

Table 23, page 50, shows the statewide plan recommended by the instructors using general shop, unit shop, or other shop plans of teaching industrial arts.

When asked to recommend a state wide plan for industrial arts, eighteen, or 36.7 per cent, of the instructors replied that they would recommend the general shop plan. Fifteen, or 30.6 per cent, of the instructors recommended the unit shop plan. Three, or 6.1 per cent, of the instructors recommended the Laboratory of Industries plan, and five, or 10.2 per cent, stated that local conditions vary too much



TABLE 23

STATE WIDE PLAN RECOMMENDED BY INSTRUCTORS USING  
GENERAL SHOP, UNIT SHOP, OR OTHER SHOP PLANS

Plans Recommended	Number of Instructors	Per Cent
General shop plan	18	36.7
Unit shop plan	15	30.6
Laboratory of industries	3	6.1
Other plans	5	10.2
No reply	8	16.3

for a state wide plan to be used. As seen in Table 23, above, eight, or 16.3 per cent, did not reply to that question.

Different phases of work offered by the instructors using general shop, unit shop, or other shop plans in the teaching of industrial arts are shown in Table 24, below.

TABLE 24

DIFFERENT PHASES OF WORK OFFERED BY THE INSTRUCTORS  
USING GENERAL SHOP, UNIT SHOP  
OR OTHER SHOP PLANS

Courses Offered	Number of Instructors	Per Cent
Woodwork	44	89.8
Metalwork	19	38.7
Drawing	44	89.8
Electricity	6	12.3
Crafts	5	10.2
Printing	1	2.0
Farm Mechanics	1	2.0

Forty-four, or 89.8 per cent of the shops offer woodwork. Nineteen, or 38.7 per cent, offer metalwork; and forty-four, or 89.8 per cent, offer drawing. Five, or 10.2 per cent, showed that crafts were offered; and electricity is offered in six, or 12.3 per cent, of the shops. One, or 2 per cent, offered printing; one, or 2 per cent, offered farm mechanics.

Table 25, below, shows the years of experience the instructors teaching general shop, unit shop, or other shop plans, have had teaching the Laboratory of Industries plan of teaching industrial arts.

TABLE 25

YEARS OF EXPERIENCE THE INSTRUCTORS TEACHING GENERAL SHOP, UNIT SHOP, OR OTHER SHOP PLANS, HAVE HAD TEACHING THE LABORATORY OF INDUSTRIES PLAN

Number of Instructors	Years of Experience	Per Cent
5	1	10.2
1	2	2.0
1	3	2.0
2	5	4.1
1	6	2.0
1	7	2.0
2	8	4.1
37	None	75.5

The question was asked, "How many years of experience have you had in teaching the Laboratory of Industries plan of industrial arts?" Table 25, page 51, shows that thirty-seven, or 75.5 per cent, of the forty-nine instructors, who were using general shop, unit shop or other plans, reported that they had no experience in teaching the Laboratory of Industries plan of teaching industrial arts. Five, or 10.2 per cent, gave one year of experience. One, or 2 per cent, gave two years of teaching experience; and one, or 2 per cent, gave three years of teaching experience in the Laboratory of Industries plan. Two, or 4.1 per cent, stated that they had five years of experience; and one, or 2 per cent, stated that he had six years of experience in teaching that method. One, or 2 per cent, gave seven years experience; and two, or 4.1 per cent, gave eight years experience in teaching the Laboratory of Industries plan.

In order to determine to what extent the Laboratory of Industries plan has been tried by the instructors who are now using general shop, unit shop and other methods, the question was asked, "Has the Laboratory of Industries plan of shop ever been used in your system?" and "If it is not now used, do you know why it was abandoned?"

The number of instructors using the general shop, unit shop, or other methods of teaching industrial arts, who have

used the Laboratory of Industries plan is shown in Table 26, below. This table shows that ten, or 20.4 per cent, replied

TABLE 26

NUMBER OF INSTRUCTORS USING THE GENERAL SHOP, UNIT SHOP,  
OR OTHER SHOP PLANS WHO HAVE USED THE  
LABORATORY OF INDUSTRIES PLAN

Question	Yes	Per Cent	No	Per Cent	No Reply	Per Cent
Has Laboratory of Industries plan ever been used in your school?	10	20.4	27	55.1	12	24.4

that the plan had been used, and twenty-seven, or 55.1 per cent replied that the plan had not been used. Twelve, or 24.5 per cent, did not reply to the question. Six of those who stated that the plan had been used did not give the reason for its having been dropped. Two instructors stated that the plan was dropped because of the lack of equipment. One stated that the plan was dropped because of the lack of ability in the industrial arts teachers, and one reported that his school was unable to secure a teacher who would teach the Laboratory of Industries method.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

A comparison of the data contributed by the instructors using the Laboratory of Industries plan of teaching industrial arts and the instructors using general shop, unit shop or other plans of teaching industrial arts reveals that only 35.6 per cent of the seventy-five schools included in this survey are using the Laboratory of Industries plan. This is due partly to the difficulties in teaching the course which stems back to the fact that most emphasis in college training has been placed on specific training for unit shops. Of the seventy-five schools included in this survey, 64.4 per cent are using either the general shop, unit shop or other methods of teaching industrial arts.

It was found that the number of college degrees held by instructors of the Laboratory of Industries and instructors of general shop, unit shop and other plans were almost equally distributed. Whereas 73.1 per cent of the Laboratory of Industries instructors held Bachelor of Science or Bachelor of Arts degrees, 73.5 per cent of the instructors using general shop, unit shop or other methods hold Bachelor of

Science or Bachelor of Arts degrees. It was found that 23.1 per cent of the Laboratory of Industries instructors hold Master of Science degrees, and 24.5 per cent of the instructors using general shop, unit shop or other methods hold Master of Science degrees. The number of instructors of Laboratory of Industries having no degree was 3.8 per cent, and the number of instructors of general shop, unit shop or other methods having no degree was 2 per cent.

The distribution of instructors who had industrial arts as their major field of study was approximately the same for the instructors of Laboratory of Industries and the instructors of general shop, unit shop or other methods. In the Laboratory of Industries method, 86 per cent of the instructors had industrial arts as their major field. In the general shop, unit shop or other methods, 89.8 per cent had industrial arts as their major field of study.

The number of semester hours of industrial arts completed by each instructor was sought. Of the instructors using Laboratory of Industries method, the number of hours ranged from fifteen to 100. This proved to be an average of forty-nine semester hours per each instructor. The number of semester hours instructors using general shop, unit shop, or other methods had had ranged from twenty-five to 100, which was an average of fifty semester hours per instructor.

The data showing the distribution of experience in teaching reveal that the instructors who use the Laboratory

of Industries method are new in the teaching field compared to the instructors using unit shop, general shop and other plans. Of the instructors using Laboratory of Industries method, 80.9 per cent have taught less than ten years and 19.1 per cent have taught ten to nineteen years. Of the instructors using general shop, unit shop or other methods, 57.1 per cent have less than ten years of teaching experience, 24.5 per cent have from ten to nineteen years of teaching experience, and 18.3 per cent have twenty or over twenty years of teaching experience.

The sizes of the various shops employed by the seventy-five instructors ranged from 500 square feet to over 3,000 square feet. The average shop size of the instructors using the Laboratory of Industries method is 1,500 square feet, and the average shop size of the instructors using general shop, unit shop and other methods is 1,653 square feet.

One of the first advantages conceded by the authorities to the Laboratory of Industries plan is its economy of equipment. It was found that the average value of tools and machinery employed by the instructors using Laboratory of Industries plan was \$1,911, and the average value of tools and machinery employed by the instructors teaching general shop, unit shop or other methods was \$4,258.

The instructors of the Laboratory of Industries plan reported an average cost of two dollars and seventy cents

to each student per semester, whereas the instructors of general shop, unit shop or other methods reported an average cost of three dollars and sixty cents to each student per semester.

Of the seventy-five teachers reporting, 32 per cent recommended that general shop be used as a state wide course of study. The unit shop was recommended as a state wide course of study by 36 per cent of the teachers reporting. Only 12 per cent of the instructors recommended that Laboratory of Industries be used as a state wide plan. There was no reply to the question from 10.7 per cent of the instructors. Other plans recommended by 9.3 per cent of the instructors were as follows:

1. Laboratory of Industries plan with only two phases of work being taught at one time.
2. Locality of the shop should determine the nature of the courses taught.

Greater exploration or a wider choice of fields is one of the advantages of the Laboratory of Industries plan. It was found that 50 per cent of the Laboratory of Industries instructors offered three phases of work, and 31 per cent offered four different phases of industrial arts in a single shop. Two phases of work were offered simultaneously by 19 per cent of the Laboratory of Industries instructors. The phases of work offered by the Laboratory of Industries instructors were woodwork, metalwork, drawing,



electricity, crafts, auto mechanics, and plastics. Woodwork was offered by 100 per cent of the instructors, 92.3 per cent of the instructors teach metalwork, 84.6 per cent teach drawing, and 61.5 per cent of the instructors teach electricity. Crafts was offered by 11.5 per cent of the instructors, auto mechanics was offered by 7.4 per cent of the instructors, and 3.8 per cent of the instructors of Laboratory of Industries offer plastics. The different phases of work offered in the general shop, unit shops or other methods shops were woodwork, metalwork, drawing, crafts, electricity, printing, home mechanics, and farm mechanics. Woodworking was taught by 89.8 per cent of the instructors, metalwork was taught by 38.7 per cent of the instructors, and 89.8 per cent of the instructors offered drawing. This showed a combination of woodwork and drawing being offered in 89.8 per cent of the general shop. Crafts were taught by 10.2 per cent of the instructors, and electricity was taught by 12.3 per cent of the instructors of general shop, unit shop or other methods. Of these instructors, 2 per cent offered printing, 2 per cent offered home mechanics, and 2 per cent offered farm mechanics. The number of phases of industrial arts being offered in the Laboratories of Industries was the same as those being offered in the general shops, unit shops or other methods except for two phases of work. Since the number of general shops, unit shops or other method shops, which was forty-nine,

was 88.3 per cent greater than the twenty-six Laboratory of Industries shops included in this survey, this is proof that one of the advantages of Laboratory of Industries plan is greater shop content.

The following questions were asked of the instructors using the Laboratory of Industries plan: How many activities do you carry on at the same time? How many activities would you recommend to be carried on at the same time? What is your class size? What do you recommend as to class size? Do you find it difficult to teach the Laboratory of Industries plan? What is the main difficulty you find in teaching the Laboratory of Industries plan? Three was the average number of activities being carried on at one time, and the majority of the instructors recommended that only one activity be carried on at one time. It was found that the average class size was twenty-seven students, and the average number of students which the instructors recommended as the ideal class size was twenty-four. Of the instructors teaching the Laboratory of Industries plan, 73 per cent replied that it was difficult to teach the Laboratory of Industries method, and 27 per cent replied that it was not difficult to teach. The main difficulties in teaching this method as reported by 73 per cent of the instructors are as follows:

1. Difficult to teach
2. Lack of time for each phase

- X 3. Disturbance from one activity when lecturing another activity
4. Controlling one activity while starting another activity
5. Lack of individual instruction
6. Classes too large
7. Lack of text books
8. Inability of instructors
9. Difficult to keep students busy

The question was asked: "How many years of experience have you had in teaching Laboratory of Industries plan?" and "Do you know why it was abandoned?" The number of years experience in teaching Laboratory of Industries plan by the teachers using the plan varied from one to nineteen years, but the average number per instructors was four years of experience. Of the forty-nine instructors teaching general shop, unit shop or other methods, thirteen reported from one to eight years of experience in teaching the Laboratory of Industries plan. The reasons given for the Laboratory's of Industries plan having been abandoned were as follows:

1. Lack of equipment
2. Lack of ability of instructors
3. Lack of ability to secure teachers who were willing to use the plan

### Conclusions

It is indicated by this study that the Laboratory of Industries plan is going to meet a real need in the industrial education program of the future; experiments in various cities have proved this to be true. The Laboratory of Industry, to be a real asset in the educational program,

must have excellent teachers, teachers who have had a wide range of experiences in a variety of crafts, teachers who can apply their technical skill in an elementary way. The teacher training institutions have not been able to supply good teachers in sufficient numbers to meet the need. As a result many communities have not yet reorganized their work on a laboratory basis. Some localities have established the Laboratory of Industries and have seemed to prosper until some other locality which could pay higher wages enticed the teacher away. Then the prosperous Laboratory of Industries became a unit shop because the new teacher could handle only certain phases of the work.

According to the information received, one of the great difficulties in the Laboratory of Industries plan is getting the class started. It is here that many teachers realize their inability to teach more than one phase of work at the same time. Over-crowded shops contribute a large part in the failure of the teacher to carry out the Laboratory of Industries plan properly, no matter how well he may know his subject or how efficient he may be as an organizer.

It is concluded from this study that the Laboratory of Industries plan as recommended by the state course of study is adequate if carried out properly. The Laboratory of Industries plan is not being followed generally because of the inability of instructors or their lack of training.

### Recommendations

The findings of this study seem to justify the following recommendations:

1. A specific course for potential Laboratory of Industries instructors should be offered in the teacher training institutions.

2. The course of study for the industrial arts department, as prescribed by the State Department of Education, should be changed in that it should limit the size of an industrial laboratory to include not more than twenty-four students per class.

3. A study should be made of other high schools which have both a larger and smaller scholastic population so that a more complete study may be obtained of the Laboratory of Industries plan.

APPENDIX

(Form 1 - Double Post Card Sent to Superintendents)

1903 W. Sycamore  
Denton, Texas

Dear Sir:

An effort is being made to study the methods, organization and subject matter in the Laboratory of Industries Plan of teaching Industrial Arts as prescribed by the State Department of Education, of the State of Texas.

Will you please fill out the attached card and return as soon as possible?

Yours very truly,

Phil W. Wright

What plan of Industrial Arts is being used in your school? Please Check:

GENERAL SHOP PLAN \_\_\_\_\_ (This includes all general courses such as woodwork, metalwork, drawing, etc.)

UNIT SHOP PLAN \_\_\_\_\_ (Specialized courses in wood, i.e., cabinetmaking; metal, i.e., welding; drawing, i.e., architectural drawing).

LABORATORY OF INDUSTRIES PLAN \_\_\_\_\_ (Several activities being taught at the same time, same class, same teacher, for specified length of time).

OTHER PLANS YOU MAY BE USING \_\_\_\_\_

OFFERING NO INDUSTRIAL ARTS \_\_\_\_\_

Name of Ind. Arts Teacher - Ind. Arts Courses Teaching

_____	_____
_____	_____
_____	_____
_____	_____

(Form 2 - Letter Sent to Instructors of Industrial Arts)

1903 W. Sycamore  
Denton, Texas

Dear Sir:

I am making a study of the Laboratory of Industries Plan of Industrial Arts as proposed by the State Department of Education of the State of Texas, to determine how effectively this plan actually functions in our schools.

At the present there is a feeling among some of the Industrial Arts teachers that the Laboratory of Industries Plan of Industrial Arts is not adequate. If so, what plan do you find most effective? If this plan is not adequate, then an effort should be made to develop a universal and effective plan of Industrial Arts for secondary schools.

I am endeavoring to determine the most effective plan used in our schools today. I believe that the Industrial Arts teachers are the logical ones to give the answer to this question.

I would appreciate it if you would fill in the enclosed sheet and return it as soon as possible. With the cooperation of the Industrial Arts teachers, I shall be able to send you a report of this study if you are interested.

Very truly yours,

Phil Wright

(Form 3 - Questionnaire sent to Industrial Arts Instructors)

School in which you teach \_\_\_\_\_ City \_\_\_\_\_

College degree you hold \_\_\_\_\_ Major \_\_\_\_\_ Minor \_\_\_\_\_

Number of college hours in Industrial Arts \_\_\_\_\_ Number

of years experience in teaching Industrial Arts \_\_\_\_\_

Size of shop or room (in ft.) \_\_\_\_\_ Approximate value

of tools and machinery \$ \_\_\_\_\_ Approximate cost to school

per semester for material \$ \_\_\_\_\_ Approximate cost to

student per semester \$ \_\_\_\_\_

What plan of Industrial Arts is offered in your school?

I. GENERAL SHOP PLAN \_\_\_\_\_

(This includes all general courses such as woodwork, metal work, drawing, etc, for a period of 18 weeks per  $\frac{1}{2}$  unit.)

II. UNIT SHOP PLAN \_\_\_\_\_

(Specialized courses in wood, (i.e., cabinetmaking) metal, (i.e., welding) drawing, (i.e., architectural drawing).

III. LABORATORY OF INDUSTRIES PLAN \_\_\_\_\_

(Several activities being taught at the same time, same class, same teacher for a specified length of time) Each of four activities taught for a period of nine weeks.

IV. OTHER PLANS YOU MAY BE USING \_\_\_\_\_

\_\_\_\_\_  
(please list)

What shop plan would you recommend for a state wide plan? \_\_\_\_\_

What plan do you think is most adequate for your respective

school? Plan I \_\_\_\_\_ Plan II \_\_\_\_\_ Plan III \_\_\_\_\_

Plan IV \_\_\_\_\_



What subjects are offered in Industrial Arts in your school?

Double check the ones you teach.

Woodwork (18 wks or more)	Yes	No	Grades	_____	_____	_____
Metalwork	Yes	No	Grades	_____	_____	_____
Drawing	Yes	No	Grades	_____	_____	_____
Crafts	Yes	No	Grades	_____	_____	_____
Electricity	Yes	No	Grades	_____	_____	_____
Others (name)	Yes	No	Grades	_____	_____	_____

If your school offers the Laboratory of Industries Plan - how many activities do you carry on in the same class at the same time? \_\_\_\_\_ How many activities would you recommend to be

carried on at the same time? \_\_\_\_\_ What is your class size?

\_\_\_\_\_ What do you recommend as to class size? \_\_\_\_\_ Do you

find it difficult to teach the Laboratory of Industries Plan?

\_\_\_\_\_ What is the main difficulty you find in teaching the Laboratory of Industries Plan? \_\_\_\_\_

---

(use reverse side if needed)

How many years of experience have you had in teaching Laboratory of Industries Plan? \_\_\_\_\_ Has the Laboratory of Industries Plan of Shop ever been used in your system? \_\_\_\_\_ If it is not now used, do you know why it was abandoned? \_\_\_\_\_

Would you like to have a report on the findings of this study when complete? Yes \_\_\_\_\_ No \_\_\_\_\_

Name \_\_\_\_\_ Address \_\_\_\_\_

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