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Title EVALUATION OF SELECTED INDUSTRIAL BULLETINS AND OTHER TECHNICAL MATERIALS RELATED TO INDUSTRIAL ARTS

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Abstract Approved
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It is the purpose of this study to have a selected group of booklets, pamphlets and charts, published by industrial firms and used as related information in industrial arts classes, evaluated by industrial arts teachers currently (1949-50 school term) employed in the Willamette Valley of Oregon. The group of materials chosen for this study, composed of 100 booklets and pamphlets and 25 charts, are representative of those published by industrial firms for distribution to teachers in industrial arts.

The names and addresses of industrial firms considered to be likely producers of teaching aids usable in an industrial arts class were compiled from SCHOOL SHOP magazine and INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine.

Personal contact with the evaluating teachers, supported by a questionnaire for rating purposes, was considered the best method of conducting this study.

Industrial firms realize the value of publishing teaching aids and invest considerable sums of money each year in the publication and distribution of them. There is a growing tendency to establish school service divisions in industrial firms which function independently and without directives from the advertising department as to content and treatment of teaching aids. Many industries employ persons who have had teaching experience, and understand the problems of the school, to prepare the teaching aids they publish.

The results of this study bring out the following significant facts:

1. Twenty-seven per cent of the materials would contribute more to the students' learning if they were printed in larger type.
2. In the majority of cases, the grade of paper used was satisfactory for use in the industrial arts shop.

3. Seventy-seven per cent of the materials were rated "attractive".
4. The colors used were an asset to the materials.
5. The size, of approximately three-fourths of the materials, is not a handicap to their use.
6. Approximately one-third of the publications were best suited for each of three ways of presentation.
7. The use of instruction sheets generally would not add to the value of the materials.
8. Ninety-two per cent of the materials were believed to contain no information too technical for the students to understand.
9. The information in these publications is valuable to students of all grade levels, except elementary grades one through six, also individuals of many interests and varying abilities.
10. Only 11 per cent of the information was considered not related to student experiences in industrial arts classes.
11. Seventy-six per cent of the materials, in their present form, will present the information in the most interesting and valuable manner.
12. Forty-four per cent of the materials are concerned with increasing the general scope of vision of the learner; thirty-four per cent have direct bearing upon the efficiency in performing work and 19 per cent were considered valuable in contributing to occupational information and guidance.
13. A mere one and five-tenths per cent of the materials were rated "out-of-date".
14. Only five per cent of the responses indicated an excessive interruption of the technical information by sales material.
15. Approximately 97 per cent of the materials do not contain enough advertising matter to supersede their educational value.

EVALUATION OF SELECTED INDUSTRIAL BULLETINS AND OTHER TECHNICAL MATERIALS RELATED TO INDUSTRIAL ARTS

by

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EVALUATION OF SELECTED INDUSTRIAL BULLETINS AND OTHER TECHNICAL MATERIALS RELATED TO INDUSTRIAL ARTS

CHAPTER I

INTRODUCTION

Purpose of the Study

If the student is to become better acquainted with the industrial world in which he lives, authentic information must be made available for his use from as direct a source as possible. The writer has felt, for the past twelve years, that the free and inexpensive materials available to schools from industrial firms are a valuable source of information. This opinion has been shared by several fellow teachers while others, for various reasons, expressed no interest in using these materials to enrich their offerings in industrial arts. This has caused an increased interest in securing the opinion of other industrial arts teachers regarding the value of such materials. Whether or not the dissenting opinion is caused by the actual make-up and content of the material has proved to be of much concern and interest. The purpose of this study is to have a selected group of these materials carefully evaluated by men who are currently engaged in teaching the industrial arts subjects in secondary school classes.

Location of the Study

The study was conducted in the Willamette Valley of Oregon. This area was chosen for the following reasons:

1. The distance from Corvallis to the various schools makes possible one or more personal contacts with the teachers evaluating the material.
2. The area includes teachers who devote full time to industrial arts classes, as well as a normal percentage who teach one or two such classes in combination with other school subjects.
3. The communities affected include both urban and rural areas.
4. A variety of types of shop programs are available, namely: general shop, unit shop, programs with a vocational emphasis, and others with the emphasis on industrial arts as a part of general education.
5. Teachers in the area received their training at institutions in different parts of the United States; this gives added value to the study since different schools of thought are represented.

Materials Selected for the Study

No attempt has been made to screen the materials so as to include only those which would supposedly bring results favorable to this study. The booklets, brochures, pamphlets and reports included are considered to be representative of those published by industrial firms. For a complete list of materials used refer to page 51. This representative group would more closely follow actual practice in a school in which the conscientious teacher selects those materials best suited to his objectives in teaching industrial arts.

Some materials received were not included in this study, for the following reasons:

1. Too technical to be of value in an industrial arts program.
2. Plainly displayed poor workmanship in their production. Even though the technical information was helpful and authentic, poor workmanship in its production would limit the effect on the work of the student.
3. Not related to industrial arts offerings.
4. The publication was a mere listing of products, more nearly representative of a catalog or of specifications on a particular machine or product.

Movie film, film strip and slides which are produced by industrial firms and used as related information in the industrial arts program have purposely been omitted from this study. It is the purpose of this study to evaluate teaching aids in the form of booklets, pamphlets or leaflets, and charts rather than film. The evaluation of visual aids in film form is a study in itself.

Method of Securing Materials

The first problem here was to compile a mailing list of industrial firms from whom materials might be secured. The SCHOOL SHOP magazine and INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine were used for this purpose. The news notes and advertising pages of the ten numbers of each magazine, for the school year 1948-49, were very carefully examined for names and addresses of firms considered likely to have such material available for distribution. The letters and general responses received with the leaflets and other materials indicate definitely an attitude of cooperation on the part of the industrial firms contacted.

Procedures Used in Making the Study

It was necessary to eliminate some items for reasons previously cited. After final selection of the materials

to be used in the study, they were made up into packets containing from five to eight booklets or pamphlets. The charts to be evaluated were assembled and placed in mailing tubes. Into each packet and mailing tube was placed a questionnaire form to be used by the teacher in rating each booklet, pamphlet or chart.

The list of teachers to be contacted was compiled from the Oregon School Directory for 1949-50. Each teacher selected for analyzing the material was personally contacted and, after a short explanation of the purpose of this study, he was asked to evaluate several separate items. If he was willing to do so, the questionnaire was explained to him and the material left with him. The ratings and the booklets were then collected, in about one week, and passed on to be evaluated by another teacher.

CHAPTER II

GENERAL BACKGROUND

Industrial Firms Realize Importance

Many industrial firms have for several years realized the value, to them and to the consumer, both present and future, of publishing technical information which they possess regarding their products. They have expended quite a sum of money in producing and distributing these materials to schools either free of charge or for the cost of producing the materials only. It has been conservatively estimated that the funds invested in the production and distribution of business-sponsored teaching materials each year exceed the annual school budgets of Delaware, Idaho, Nevada, New Hampshire, Vermont and Wyoming combined (4, p.1). Some teachers feel that business organization should produce free teaching materials with no advertising whatsoever on them. This attitude is hardly fair to the producer of this material since the expenditure made by him must be justified on some basis other than pure philanthropy.

Department Responsible for Preparation

Some business firms are making an attempt to separate the advertising department from the department

responsible for publishing and distributing teaching aids. This trend seems to be an attempt on the part of industry to concede some of the wishes of educators regarding the preparation of technical information available to schools. The results of one study (4, p.32) show that approximately 57 per cent of the leading sponsors of school materials look largely to their advertising departments for the preparation and production of their teaching materials. It is significant, however, that twenty of the eighty-eight sponsors cooperating in this study have school service divisions in their public relations departments and not in the advertising departments, that thirteen additional business firms or organizations prepare their teaching aids independently of the advertising department, and that five other sponsors have educational divisions as completely independent departments. The fact that there is a growing tendency to establish school service divisions which function independently and without directives from the advertising department as to content and treatment of teaching aids is frequently voiced by business representatives (4, p.32).

Business Personnel Responsible for Preparation

Many industrial firms employ well trained people who have had teaching experience and who understand the

problems of the school to prepare the teaching aids they publish. It has recently come to the attention of the writer that one manufacturer of machinery was seeking an employee to head up their sales program to schools. One of his major responsibilities would be the preparation of technical information that would be of value as a teaching aid. This firm preferred a man who had had successful teaching experience in industrial arts, who knew the problems of the school and who had fulfilled at least half of the requirements for a doctor's degree. The person employed was an educator, not a high pressure salesman. He has a rich experience in teaching general shop and understands the problems of the school, both from an administrative standpoint and that of the teacher. He is well qualified to produce technical information based upon sound educational objectives.

Dr. Thomas J. Sinclair, in his recently published study (4, p.33), points out the following results regarding teaching experience of business personnel:

> Business firms and associations represented in this survey were asked how many of their nonclerical employees have teaching experience or were trained for teaching. Eighteen firms gave no information on this point. Of the seventy that gave information, twenty stated that none of their nonclerical employees had training or experience as teachers. Forty-six sponsors reported that they have nonclerical

> employees who have had teaching experience or were trained for teaching. Of these forty-six sponsors, eighteen reported that they have one such employee who devotes a large part of his time to the preparation and distribution of materials for schools. Fourteen sponsors have two such employees, five have three, two have four, two have five, one has six, three have seven, and one has twelve. Four additional responses were as follows: (1) Don't know, but quite a few. (2) All seven are professional educators. (3) All six do. (4) All seven have B.S. degrees in education and have taught - one has master's degree, and director has Ph.D.

Related Information Defined

The subject matter of industrial arts courses is of two types. First, there is the work which is largely manipulative. The second type of subject matter is usually designated by such terms as "related", "related technical", or "related subject matter (5, p.57)". The manipulative work includes the activities carried on with tools and machines; and the projects which the students build or jobs they complete are the tangible results connected with this type of subject matter. Included in the second type are all the lessons and other activities that cannot be classified as manipulative.

There are many sources of this related subject matter, some of which are: publications from industrial

firms, textbooks, movie film, film strip, 2x2 slides, field trips and talks from interested business men. This study deals only with those related materials published by industrial firms.

Classification of Related Materials

Materials for related information may be classified under three different kinds: (1) items that have direct bearing upon the efficiency in performing work, (2) material that has to do with increasing the general scope of vision of the learner or workman, and (3) information leading to occupational information and guidance (2, p.177).

In the first classification would fall those materials which would give the student information that would make it possible for him to turn out a more perfect product or to do a job more efficiently. For example, consider the chart, "60° V-TYPE THREAD DIMENSIONS." From this chart a student will gain information which will make it possible for him to adjust his machine and make successive measurements on his work so that the finished screw will be accurate in its dimensions.

By referring to a pamphlet giving the type of steel best suited for making a cold chisel, the student would have a much higher quality product when he finished than if he had selected the steel without that help.

The second classification would include those materials which would broaden the knowledge of the student. He may successfully perform his manipulative work without this information but his general knowledge will be much greater after obtaining it. For example, consider the booklet "THE PICTURE STORY OF STEEL". The student could successfully complete any one of a number of projects made of steel without knowing anything about the manufacture of steel or the raw products from which it is made. However, if he studied the booklet mentioned, he would gain an appreciation of the work that produced this steel he is using and would gain some knowledge concerning the conversion of raw materials into steel. Information of this type makes a definite contribution to his education.

In industrial arts classes the aim is to give the student information and experiences which will broaden his knowledge and make him a better member of society. If this purpose is to be accomplished it must be in broader terms than merely making something of metal, wood or other material. It is in this realm that this related subject-matter makes a real contribution. Information, then, even if having only a remote relationship to the immediate work in the shop, is justifiable. To a large number of students it is fully as valuable as the actual tool and machine operations.

Forms of Related Materials

In a study recently completed (4, p.23), it was pointed out that booklets were most frequently used by industry as a means of presenting information to schools. The results showed that 84.1 per cent of the business organizations cooperating in the study use booklets frequently and that 11.4 per cent use booklets occasionally.

Leaflets - which differ from booklets in that leaflets are usually two- or four-page publications without covers - are the next most frequently used means employed by manufactures for distributing related information and factual data helpful in the school shop. Charts and motion pictures tie for third place, followed closely by teacher's manuals.

CHAPTER III

THE STUDY

The cooperative spirit in which the various teachers accepted the responsibility of evaluating the booklets, pamphlets, and charts was most beneficial to the study. Not one seemed to treat the matter lightly. No one seemed to assume that it made no difference how they answered the questions. The general attitude of the teachers was one of wholesome and sincere cooperation. The evaluating process is summed up in the following remarks from two different men: "If I accept your material I'll take the time to do a good job of it." "I came to school at 7:30 this morning so I could do justice to the evaluation of this material."

The physical limitations, especially the amount of wall space, of the room or building in which the individual evaluating teachers work, has had some influence on the evaluation of a given item, particularly the charts. This is evident in the following comments:

1. Five minutes of instruction will give all the needed information and will save valuable wall space.

2. Size of chart makes it worthless unless a shop had no windows.

3. I am requesting that space be provided in our new shop so I can use such charts as those.

4. These charts are good but the only place I have for anything like that is high on the wall that will be built above a glazed partition.

5. Chart O.K. if the student can get close enough.

While it was not an objective of this study to acquaint the various teachers with the available teaching aids which would contribute to their industrial arts program, it soon became evident that it would serve that purpose for many of the teachers. During the personal interviews these were some of the remarks: "Well, I'll learn something too while evaluating this material." "This will help me too." "That's certainly an attractive chart; I would like one for my shop." An additional comment written on one of the questionnaires read, "A very good booklet, am sending for a copy; thanks for showing it to me."

Size of Type

The size of type naturally has a marked influence on the student's reading comprehension. If the size of the type is such that it causes eye strain, the benefit gained from the reading will be limited. If the size is conducive to easy reading he will read more readily and get more from the material because of the absence of eye strain. A student who spends his time trying to "see"

the words soon becomes lost in the seeing task and forgets the trend of thought in the reading.

To understand a comparison based on size of type one should first understand the meaning of the word POINT, which is the universal standard of measurement, throughout America, for all composing material. The unit of measure, the POINT, is approximately one-seventy-second of an inch (3, p.10). Type referred to as "twelve point" is approximately one-sixth of an inch high, and type one-half inch high is called "thirty-six point".

In the booklets and pamphlets selected for this study the smallest type is 6 point, the largest 12 point. Most of the materials are printed in 8 and 10 point type. The printing on the charts ranged from 10 point type to letters two inches in height. As a matter of comparison: the body of the average newspaper is 8 point type which is the same as COLLIERS magazine.

Of the 328 responses to the question, "Is the size of type conducive to easy reading?", eighty-nine were checked "no"; 239 "yes". This indicates that, in the judgment of the teachers, 27 per cent of the publications evaluated would contribute more to the student's learning if they were printed in larger type.

Grade of Paper

Due to the type of activity in an industrial arts class the teaching aids used will be subjected to treatment not normal in the ordinary classroom. They will be handled, in many instances, with greasy, wet or dirty hands. These aids will be placed in tool kits where they will come in contact with dirt or grease or be torn or cut on sharp tool edges. Many times they will come in contact with hot metal or acid on a soldering bench. It is quite often necessary to roll up charts and place them in mailing tubes for storage purposes, or just roll them up and place a rubber band around the roll.

Regarding the handling of this related information, one evaluating teacher made this significant remark, "It is satisfactory for school use if it is replaced as needed." The cost of producing charts which would withstand all types of treatment would be prohibitive. It is much more practical to use them as they are currently produced and replace when necessary.

The student cannot be expected to take time away from his work to wash his hands each time he wishes to refer to a chart or booklet. If he did this, too much of the period would be lost at the wash basin. As an example, consider a student who is working on a machine, a lathe for example, and needs to refer to a chart or booklet to

find the correct angle to grind the cutter or tool bit. If two minutes were spent washing his hands and he found it necessary to make five references during the period, ten minutes of working time would be lost as far as his work is concerned.

As might be expected, a wide variety of weights of paper, as well as finishes, was represented in the booklets, pamphlets and charts evaluated. Some of the charts were made up with a cloth backing and metal edge protectors, both top and bottom; others were merely printed on comparatively light-weight paper. Some of the paper would not crease easily, particularly advantageous when the charts were unavoidably folded, while the folding of others made a very objectionable crease in the chart. These creases are most undesirable, particularly when they are so positioned that they obliterate some of the information.

When the conditions pointed out in the preceding paragraphs are realized, the results of this study have much more meaning. There were 328 responses to the question, "Is the grade of paper upon which it is printed satisfactory for school use?" Forty-seven of these responses were negative, indicating that 86 per cent of the booklets, pamphlets and charts were considered, by the evaluating teachers, to be printed on a grade of paper which would withstand the treatment normally received in

the industrial arts classes.

Attractiveness

If courses in industrial arts are to make a contribution to the students' appreciations of those things which are attractive and which instill in him a desire to produce attractive projects, the teaching aids used must be attractive within themselves. If they are not attractive, the impression left on the student will likely not be as helpful as desired.

A direct relationship between attractiveness of the material and the cleanliness and orderliness of the school shop was forcibly impressed upon the writer in the course of the personal contacts made during this study. If the shop is neat and orderly, teaching aids which are not attractive seemingly have very little value; they are out of place in a shop of this type. If the related materials used are very attractive but are placed in a dirty, unorganized shop, their value will be greatly reduced.

Seventy-seven per cent of the 320 responses regarding the attractiveness of the booklets, pamphlets and charts, were in the affirmative. A comparison of the results regarding booklets and pamphlets as compared to charts is significant. Of the 74 responses relative to

charts 63 were "yes" and 11 "no", while 184 responses were "yes" and 62 "no" relative to booklets and pamphlets. From these responses it appears that approximately 15 per cent of the charts were not considered attractive, as compared to 25 per cent of the booklets and pamphlets considered below par in attractiveness. The wide difference here might be caused by the fact that 100 booklets and pamphlets were used in the study and only 25 charts; however, industry does not publish information related to industrial arts instruction in chart form as frequently as in booklet form. These results are considered to be representative since the proportion used follows the policy of industry in publishing information available to schools.

These additional remarks regarding attractiveness are important to this evaluation.

1. Yes, attractive to individual persons.
2. It is attractive to the craftsman-type person.
3. No, it is too crowded to be attractive.
4. A good chart but would be more attractive if the print was larger.
5. This chart is highly attractive and would appeal to students.

Use of Color

Scientific experiments have shown that a person

subjected to a given color for as little as five minutes will realize a change in his mental as well as his muscular activity. The medical profession has long realized that colors can be used to stimulate or depress. Some colors help people to relax and be cheerful. Others stimulate and invigorate. Still others set up irritation and actual physical discomfort (1, p.3).

The remark of one evaluating teacher, "One gets tired of blueprints; why don't they get out more colored charts like this.", expresses a desire on the part of some teachers of industrial arts to get more color into their surroundings. Many industries are realizing the value of color and are applying it to the production of teaching aids for schools. By the use of color in schools, applied to buildings and equipment, as well as to teaching aids, concentration is assisted, energy is stimulated, and eye fatigue is retarded among students and teachers alike.

The opposite viewpoint is brought out in the following remark, made by another evaluating teacher: "This colored chart could kill the color scheme of the shop." As is quite evident in this comment, some teachers do not feel the importance of color as it is related to industrial arts activities.

In reply to the question, "If in color, do the colors used make this material more attractive?", there

were 129 responses. Of these, 112 were "yes" and 17 "no", indicating that approximately 87 per cent of the evaluating teachers considered the colors used an asset to the material.

Size of Material

As would normally be expected, the booklets, pamphlets and charts are produced in a large variety of sizes. Of the booklets and pamphlets used in this study, the smallest measured 3 inches wide by 6 inches long; the largest, 8 1/2 inches by 11 inches. Three different sizes predominated: approximately 3 1/2 inches by 6 1/2 inches, 6 by 9 inches and 8 1/2 by 11 inches. The number of pages ranged from one to 72, the 72 page publication being a booklet 8 1/2 by 11 inches. The smallest chart was 8 1/2 inches wide by 14 inches long, the largest 40 inches wide by 60 inches long. The majority of the charts were approximately 17 inches wide and 27 inches long.

The following remarks regarding size are indicative of the general negative opinion of teachers evaluating this material:

1. The size is a handicap as far as filing is concerned.

2. A handicap to the extent that too much material is placed on a small sheet.

3. It is unfortunate that this chart is as

small as it is. I have one in my drafting room but its use is limited due to its size.

4. If all materials of this type were printed on a standard sheet size its use would be of more value.

5. The size is too small; it should be in a larger booklet, larger size pages.

6. The booklet is too small for high school students to keep track of, and difficult for the instructor.

7. If the book and printing were larger it would be more useful.

One additional remark was made relative to the size: "The size of this book is O.K., as it might be carried in the student's pocket."

One would naturally assume from these remarks that the size of much of the material is a handicap to its use, but the results do not bear out this assumption. There was a tendency, on the part of the evaluating teachers, to make only negative additional remarks.

There were 322 responses to the question, "Do you believe the size of this material is a handicap to its use?" Seventy-four per cent of these responses indicated that the size is not a handicap to the use of the booklets, pamphlets and charts.

Method of Presentation

As a means of determining the best method of presenting the information contained in the booklets, pamphlets and charts under consideration, the following question was submitted to the evaluating teachers:

> Do you think the information included in this material could best be presented by:
>
> ____A. Lectures by the instructor
>
> ____B. Study assignments and student reports
>
> ____C. Voluntary reading by the student
>
> ____D. Other (please list) _____
>
> _____

When interpreting the results it must be remembered that some checked only one of the four alternate answers while others checked various combinations of the four.

Comparing the A,B,C, and D responses, each one individually and without regard for the combinations, gives a total of 446 responses. Of these, approximately 31 per cent favored "A", 30 per cent "B", 28 per cent "C" and 11 per cent "D".

Comparing the responses indicating either A,B,C,D, or a combination of two or more of the four, gives a total of 227 responses indicating only one of the four (A,B,C, or D). On a percentage basis, these results

indicate 27 per cent for "A", 31 per cent for "B", 33 per cent "C" and 9 per cent for "D".

A rather high correlation between the two methods of interpretation is found. Without regard for the combinations, "A" rated 31 per cent, considering combinations 27 per cent; "B" rated 30 per cent without, 31 per cent with; "C" rated 28 per cent without, 33 per cent with; "D" rated 11 per cent without, 9 per cent with.

Using either interpretation as a basis, the results indicate that the materials may be presented in a variety of ways and the students will still receive the value of the information contained therein.

In suggesting additional ways of presenting this information to the students, demonstrations were very prominent, being suggested by 17 responses. Other ways suggested by the evaluating teachers were displays, sketches and drawings, lesson plans, motion pictures, field trips if possible, and reference data.

Use of Instruction Sheets

To be of value in a teaching situation, instruction sheets must be prepared with a great deal of care and with a specific goal in mind. The use of instruction sheets with certain teaching aids adds greatly to their overall value. The results of this study, however,

indicate that the use of instruction sheets with the booklets, pamphlets and charts evaluated would not add to their value in the majority of cases.

There were 280 responses to the question, "Do you think the use of instruction sheets would add to the value of the information contained in this material?" The negative answers accounted for 59 per cent of the total. These results indicate also that the majority of the teaching aids evaluated were made up in a manner such that the information presented was understood by the students.

Grade Level

The answers to the following question were quite varied, although significant:

> What grade level do you consider this material best suited for?
>
> ____elementary grades ____college
>
> ____junior high ____other _____
>
> ____senior high

There were 325 responses to the question and 164, or slightly more than 50 per cent, of these checked only one of the five possible answers. These 164 responses were divided as follows: elementary grades 2; junior high

49; senior high 77; college 26; other 10.

If we consider only these 164 responses, we find that 47 per cent are considered best suited for the senior high grade level, 30 per cent for the junior high, and 16 per cent for college.

The 161 responses indicating more than one grade level for the same publication suggested the following combinations: elementary - junior 2; elementary - junior - senior 1; junior - senior 25; junior - senior - college 22; junior - senior - other 4; junior - other 1; junior - senior - college - other 5; senior - college 71; senior - college - other 23; college - other 6.

In these results we notice the greatest emphasis on the senior - college combination with junior - senior and junior - senior - college combinations next. The large variety of combinations points out the fact that the booklets, pamphlets, and charts evaluated apparently are such as to serve students of many ages and levels of ability.

This significant remark was made by one teacher, who checked <u>all five</u> of the answers: "By checking all, I mean to infer that color is an important consideration at all levels." The booklet being evaluated in this instance was "Color Dynamics", for school shops.

If each level checked is considered separately and

the combinations are not counted as such, we have 548 responses. These responses are divided as follows: elementary 5 or 0.9 per cent; junior high 110 or 20 per cent; senior high 230 or 42 per cent; college 154 or 28 per cent; other 49 or 9 per cent.

When the results obtained from the two methods, one counting the combinations as such, the other not, are compared, the implications are essentially the same. The greatest number of publications being evaluated are best suited for the senior high level, junior high next and college third.

One of the evaluating teachers made this thought-provoking remark, "I do not teach grades, groups or classes; I teach individuals". The results relative to the grade level for which the booklets, pamphlets and charts under consideration are best suited, have as significant a value for this type teacher as for those who do teach "grades". In these materials would be found information suitable for individuals of many levels of interest and ability.

Those responses indicating "other" were as follows: trade or vocational school 25; adult 10; industry 4; special students 1; arts and crafts in college 1; on-the-job training 1; camp or scout group 1; shop maintenance 1; avocational 1.

The most significant implication of the results regarding "grade level best suited for" may be summed up in the following statement: The teaching aids evaluated in this study, by teachers of industrial arts who are currently on the job, contain a variety of information. This information is valuable to students of all grade levels, except elementary grades one through six, as well as individuals of many interests and varying abilities.

Technical Content

The related information presented must be in a form not too technical for the students to comprehend. If the terms used are highly technical and completely foreign to the students' background, the value of the information presented will be greatly reduced. The student is apt to be lost, or to refuse to read a highly technical publication, mainly because it has no meaning for him.

Many industrial firms employ persons trained for and experienced in teaching to prepare the teaching aids they offer for school use. This is a definite advantage to the teacher using these aids and is partially responsible for the results obtained regarding technical content.

Of the 325 responses to the question, "Is the information too technical to be of educational value to the students of the grade level suggested?", only 26 were

"yes". This indicates that 92 per cent of the materials were believed to contain no information too technical for the student to understand.

Relation to Industrial Arts Experiences

One of the primary objectives of industrial arts is to explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products and occupations (5, p.47).

If the objectives of industrial arts are to be accomplished, in the most desirable manner, the information students receive must be related to the experiences they have while taking industrial arts. However, as stated in the foregoing chapter, information with only a remote relationship to the immediate work in the shop is sometimes justifiable. Many times the teacher is unable to determine just where a student's real interest lies. Some remotely related bit of information may challenge the student and cause his interests to be greatly stimulated. It is important that the teachers point out to the students the way in which the information they receive is related to the work they are doing, and why it is important for them to know the facts presented.

It must be remembered that industrial arts in the school is essentially manipulative; too much emphasis

must not be placed on the related information, regardless of its degree of relationship, to change it into a discussion subject of the academic type. However, the offerings of industrial arts must not be narrowed down to the bare manipulative processes lest the educational and exploratory value of these offerings be dangerously limited.

There were 317 responses to the question, "Is this information related to student experiences in the industrial arts?" The 34 negative responses would indicate that nearly 11 per cent of the materials were not related to the student experiences in the industrial arts classes, according to the evaluating teachers.

Form

As stated in Chapter II, industry most frequently publishes its information in the form of booklets, with pamphlets ranking second and charts third. If the student is to gain the greatest value from the related information available, it must be in the form best suited to his needs and most likely to appeal to him. Some types of information can be published in either of the three forms mentioned and be equally valuable in a teaching situation. Other information is most valuable in only one of the forms mentioned. Consider an assignment in

which the purpose is to give a general picture or concept of the many and varied products which come from our forests. A chart made up in attractive colors, giving an overall picture of the many and varied products, would be much more meaningful to the student than a discussion of these products in a booklet or a listing of products in a pamphlet. The student would be much more apt to remember the information gained from the chart, not because of the information itself but as a result of the form in which it was presented.

The question, "Do you think this information could be better presented in another form? (Booklet, Chart or Pamphlet)", was used as a means of determining the suitability of the particular form for the information contained therein. There were 309 responses to this question, the affirmative answers totaling 74 and the negative 235. This would indicate that 76 per cent of the materials were considered, by the evaluating teachers, to be in a form that would present the information to the reader in the most interesting and valuable manner.

The following additional remarks are significant regarding form:

1. The way the material unfolds makes it difficult to follow. A chart or regular booklet would be better.

2. Some slides or demonstration materials

would aid in its presentation to a group.

3. It is not presented in a form that students would readily read. Color would help.

4. The working procedures could better be presented with a pictorial chart.

5. I believe a large chart should be displayed and a notebook size given to each student.

6. Could include more information on different operations - but a very fine chart.

7. Has some material in the back that could be used in the form of larger charts.

8. Is reprint from film; film would serve purpose better.

9. Actual samples would teach more effectively.

10. Excellent in present form.

Classification of Material

The following question was used as a means of classifying the various teaching aids being evaluated:

In which of the following classifications would you place this material?

____A. Has direct bearing upon the efficiency in performing work.

____B. Has to do with increasing the general scope of vision of the learner.

____C. Material leads to occupational information and guidance.

____D. Other (please list) _____

The responses given for "Other" accounted for less than 3 per cent of the total of 417 responses and were not significant to this classification. The evaluating teachers considered 34 per cent of the publications to have direct bearing upon the efficiency in performing work; those concerned with increasing the general scope of vision of the learner accounted for 44 per cent and 19 per cent were considered to be valuable in contributing to occupational information and guidance.

These results indicate the greatest number of publications do contribute to the general knowledge of the student. Next in importance is the contribution to the efficiency of his manipulative work in the industrial arts classes, and thirdly, the contribution to occupational information and guidance.

Since industrial arts objectives are not vocational in nature but are concerned with making a definite contribution to the student's general knowledge, the materials used as teaching aids should place the emphasis on general knowledge. The results concerned with classification show that the information contained in the teaching aids published by industrial firms closely parallels the objectives of industrial arts.

Up-to-Date

The information contained in the teaching aids used in the classroom must be up-to-date, if the student is to gain the greatest value from them. In the exploratory pursuits of industrial arts it is highly essential that the information given the students be the most recent information available. Although it is valuable for them to know former methods employed, and materials used by industry, it is more important for them to know the most recent developments. The student must have an opportunity to explore industrial practices of present day industry so that he will be educated for living in the present society.

There were 322 responses to the question, "Do you think the material up-to-date?" Only 1.5 per cent of these responses were negative.

When we consider the fact that 98.5 per cent of the materials evaluated in this study were considered up-to-date, we can very safely say that industry furnishes the schools with informative materials that are not outdated. It is a known fact that industry reprints its teaching aids when there are changes in procedures or materials used. This constant revision is a factor of vital importance to an industrial arts program.

Interruption by Advertising

As previously stated, it is hardly fair to expect industry to produce teaching aids without any advertising whatsoever. It is fair, however, both to the industrial firm and to the teacher using the material, to expect advertising so placed that it will not interrupt the technical information. If the student is interested in what he is reading and is suddenly confronted with a "sales talk" on some particular company's product, the educational value of this technical information will be drastically lowered. This interruption in the trend of thought could in some cases cause the student to put the information aside and refuse to read further.

The 324 responses to the question, "Is the technical information interrupted excessively by sales material?", lead one to believe that industry realizes the danger of interruptions and attempts to avoid them. Only five per cent of the responses indicated an excessive interruption of the technical information by sales material. Considering the fact that 95 per cent of the teaching aids furnished schools by industrial firms present this information in an uninterrupted manner, one may use the teaching aids published by industrial firms knowing that the technical information presented is

uppermost and that most advertising is incidental.

Amount of Advertising

As previously cited, some expect industrial firms to publish teaching aids without any advertising while others say only the name of the sponsoring organization should be used. In a recent study (4, p.27), the teachers involved stated that approximately 20 per cent of the booklet or chart should be reserved for messages of an advertising nature. These facts are given to show the wide difference in opinion of teachers of many different subjects.

The question, "Is the amount of advertising in this material enough to make it objectionable?", was not used in this study to determine the percentage of area considered acceptable for advertising. The purpose here was to determine whether or not the amount of advertising present in the various booklets, pamphlets and charts was enough to make its use objectionable in the school shop.

In answer to the question cited above there were 327 responses. Slightly more than 3 per cent of the responses indicated there was enough advertising present to make the use of any of the informational aids objectionable in the school shop. When it is realized that approximately 97 per cent of the materials do not contain

enough advertising matter to supersede the educational value of the publications, these teaching aids may be used knowing the student will benefit from their use.

The following comments regarding the amount of advertising are significant at this point:

1. The topic of propaganda is so strong at present that advertising is a light form and the student must learn to compare before he believes or purchases items.

2. A complete lack of company advertising makes this an unbiased teaching aid.

3. This teaching aid has no advertising and gives actual unbiased information.

4. Development of a company - "all" advertising but not objectionable because accepted as such.

Additional Comments

The evaluating teachers were asked to give any suggestions or comments they might have relative to the uses and values of the teaching aids they were evaluating. Those comments directly related to a specific question used in the questionnaire have been previously cited. The following comments, although not directly related to any one specific question, are pertinent to this study:

1. In order for students to benefit from this they would have to be required to make a report or receive a lecture to even become interested.

2. This aid can perhaps best be used as reference material in the drafting room.

3. This is a good chart for use in a general shop or metal shop where explanation is first made by the instructor.

4. One of the best charts I've seen. I have one right above a set of bits where it can be referred to easily.

5. This chart could be used to great advantage by students, when making assignments on saws.

6. I would be in favor of a chart which would consider only one type of information rather than several on one chart.

7. A fine book for students of high I.Q. and ability; average student needs a very simplified instruction sheet.

8. Valuable reference or even text for beginning students.

9. A very good booklet.

10. Pages 3 to 25 very good - pages 26 to 48 simply a catalog, of little value.

11. Vocabulary hard for most students.

12. Not important enough to take up space.

13. Of little value to average student.

14. Nice to know but hard enough to get them to study important operations.

15. Requires study to interpret.

16. Should not occupy space for too long a time.

17. A very good chart.

18. Information not important enough for space required.

19. This is very good.

20. Rewrite to lower reading level.

21. Attempts to be text material but coverage is not adequate.

22. Could have more illustrations.

23. Illustrations make it especially valuable and easy to read.

24. Written in difficult style.

25. Too much information in one pamphlet to be of the most use in class situations.

26. Very well illustrated.

27. Storage is a problem with this type of sheet.

28. Material useful in shop as a supplement to the regular text.

29. Excellent lecture aid; could be posted for specific assignment.

30. Very useful in covering bare walls in an interesting and helpful manner. Creates favorable impression.

31. Aid to learning nomenclature while working in shop.

32. An excellent chart.

CHAPTER IV

SUMMARY AND CONCLUSIONS

If the students in industrial arts are to receive the related information that will make the greatest contribution to their general education, the material used must come from as direct a source as possible. The format of these aids, as well as the technical content, must appeal to the students. It is the opinion of the writer that one of the most valuable sources of this related information is the free and inexpensive teaching aids available to schools from industrial firms. It was the purpose of this study to have a selected group of these materials carefully evaluated by men who are currently engaged in teaching the industrial arts subjects in secondary school classes.

The Willamette Valley of Oregon was chosen for the location of the study, first, because the distance from Corvallis made possible personal contacts with the evaluating teachers. In this section would be found both full-time and part-time industrial arts teachers who were trained at institutions in different parts of the United States. A variety of shop programs were present in the schools of this area and both urban and rural communties would be found.

The materials selected for this study are a

representative group of those published by industrial firms for distribution to teachers of industrial arts. Some of the publications received were not included in this study because of their highly technical content, or their display of poor workmanship in producing the teaching aid. Some of the booklets received were not related to industrial arts offerings, others were merely catalogs or specifications on a particular machine or product. Movie film,film strip, and slides, produced by industrial firms and used as related information in an industrial arts program, were omitted from this study because the evaluation of visual aids in film form is a study in itself.

The listing of industrial firms considered to be likely producers of teaching aids usable in an industrial arts class was compiled from the SCHOOL SHOP magazine and INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine. The ten numbers of each magazine, for the school year 1948-49, were very carefully examined for these names and addresses.

Personal contact with the evaluating teachers, supported by a questionnaire for rating purposes, was considered the best method of conducting this study. The booklets, pamphlets and charts were conveniently packaged for handling and were personally distributed among the evaluating teachers. The list of teachers to be contacted

was compiled from the OREGON SCHOOL DIRECTORY for 1949-50. Approximately one week after distribution the materials were collected, new questionnaires placed in the packages, and they were again distributed for evaluation by other teachers.

Many industrial firms realize the value of publishing technical information and making it available to schools. A conservative estimate of the funds invested by industrial firms in the production and distribution of teaching aids exceeds the annual school budgets of Delware, Idaho, Nevada, New Hampshire, Vermont and Wyoming combined.

It has been pointed out that approximately 57 per cent of the leading sponsors of school materials look largely to their advertising departments for the preparation and production of their teaching aids. Despite this fact, there is a growing tendency to establish school service divisions which function independently and without directives from the advertising department as to content and treatment of teaching aids. People who are well trained, have had teaching experience, and who understand the problems of the school, are employed by many industrial firms to prepare the teaching aids they publish.

Related information, as applied to industrial arts may be defined as all the lessons and other activities

that cannot be classified as manipulative.

Materials for related information may be classified under three different kinds: (1) items that have direct bearing upon the efficiency in performing work, (2) material that has to do with increasing the general scope of vision of the learner or workman, and (3) information leading to occupational information and guidance.

Booklets are most frequently used by industry as a means of presenting information to schools. Leaflets rank second; charts and motion pictures tie for third place.

The various teachers who were asked to evaluate the different booklets, pamphlets and charts accepted this responsibility in a most cooperative spirit.

The amount of wall space in the various shops had some influence on the evaluation of the charts; those evaluations by men teaching in shops with much wall space was more favorable than those not having much wall space.

It became evident in the early part of the study that, although it was not an objective of this study, it would serve as a means of acquainting some of the teachers with available teaching aids which would contribute to their industrial arts program.

The results of this study bring out the following significant facts:

1. Twenty-seven per cent of the publications evaluated were considered, by the evaluating teachers, to be printed in type that was too small. They would contribute more to the students' learning if they were printed in larger type.
2. Eighty-six per cent of these teaching aids were considered printed on a grade of paper which would withstand the treatment normally received in the industrial arts classes.
3. Seventy-seven per cent of the booklets, pamphlets and charts being evaluated were rated "attractive". The charts rated better than the booklets and pamphlets; approximately 15 per cent of the charts were considered below par in attractiveness, 25 per cent of the booklets and pamphlets.
4. Eighty-seven per cent of the evaluating teachers considered the colors used, in those publications that were not black and white, an asset to the material.
5. Even though a very large variety of sizes were present, seventy-four per cent of the responses indicated that the size is not a handicap to the use of the booklets, pamphlets and charts.

6. Given a choice of four answers, the evaluating teachers indicated that approximately 29 per cent of the information in the booklets, pamphlets and charts could best be presented through lectures by the instructor. Study assignments and student reports were best for 30 per cent and voluntary reading by the student, approximately 30 per cent. Eleven per cent of the materials could best be presented by some other method than these three.
7. The use of instruction sheets with the teaching aids evaluated would not add to their value in the majority of cases.
8. Ninety-two per cent of the materials were believed to contain no information too technical for the student to understand.
9. The teaching aids evaluated in this study contain a variety of information. This information is valuable to students of all grade levels, except elementary grades one through six, as well as individuals of many interests and varying abilities.
10. Approximately 11 per cent of the information contained in the materials was considered not

related to student experiences in the industrial arts classes.

11. The form (booklet, pamphlet or chart) used for 76 per cent of the materials was considered to be that which would present the information to the reader in the most interesting and valuable manner.

12. The evaluating teachers considered 34 per cent of the publications to have direct bearing upon the efficiency in performing work; those concerned with increasing the general scope of vision of the learner accounted for 44 per cent and 19 per cent were considered to be valuable in contributing to occupational information and guidance.

13. A mere one and five-tenths per cent of the materials were considered out of date.

14. Only five per cent of the responses indicated an excessive interruption of the technical information by sales material.

15. Approximately 97 per cent of the booklets, pamphlets and charts evaluated do not contain enough advertising matter to supersede the educational value of the publications.

The additional comments made by the evaluating teachers, both those relating to a specific question and the general ones, were a significant contribution. These comments added much to the interpretation of the results.

LITERATURE CITED

1. Color Dynamics. Pittsburgh, Pittsburgh Plate Glass Company, 1949. 35p.

2. Ericson, Emanuel E. Teaching The Industrial Arts. Peoria, The Manual Arts Press, 1946. 377p.

3. Polk, Ralph W. Vocational Printing. Indianapolis, Guy M. Jones Company, 1918. 243p.

4. Sinclair, Thomas J. A Report About Business-Sponsored Teaching Aids. Dansville, F.A. Owen Publishing Company, 1949. 113p.

5. Wilber, Gordon O. Industrial Arts in General Education. Scranton, International Textbook Company, 1948. 356p.

APPENDICES

APPENDIX A

MATERIALS EVALUATED IN THIS STUDY

MATERIALS EVALUATED IN THIS STUDY

SUBJECT AND TITLES	TYPE
Abrasives	
Abrasive Products for the Foundry	Booklet
Abrasives - Their History and Development	Booklet
Carborundum Abrasive Products	Chart
Causes and Correction of Common Grinding Errors	Booklet
Coated Abrasives	Booklet
From the Far Corners of the Earth	Booklet
Handbook on Abrasives and Grinding Wheels	Booklet
Lecture Course on Coated Abrasives	Booklet
Romance of Carborundum, The	Booklet
Safe Speeds for Grinding Wheels	Booklet
Sandpaper - Its How and Why	Booklet
Care of Machinery	
From the Master Cabinetmakers to Woodworking Machinery	Pamphlet
Keep Your Lathe Clean	Booklet
Keep Your Lathe in Trim	Booklet
Coal and Petroleum	
Burning Rivers, The	Booklet
Early Years, The	Booklet
Few of the 200,000 Products Derived from Bituminous Coal, A	Chart
Drafting and Paper	
Basic Standards in Mechanical Drafting	Chart
Biography of the Founder - Higgins Ink Company	Pamphlet
Drafting Materials - Their Care and Use	Booklet
From Spruce Tree to Writing Paper	Pamphlet
History of Ink	Pamphlet
Ink Sketching	Pamphlet
Paper - Its Story	Booklet
Standard Symbols for Wiring Plans	Chart
Standard Technique in Forming Letters	Chart
Symbols - Architectural and Engineering	Chart
Trees for Tomorrow	Booklet

Finishing Equipment

ABC of Spray Painting Equipment . . . . . Booklet
Dico Manual for Buffing with Cloth Wheels . . . Pamphlet

Finishing Materials

Care of Furniture, The . . . . . Pamphlet
Fifty Thousand Years of Protection and Decoration . . . . . Booklet
How to Use Shellac for Best Results . . . . . Booklet
Pittsburgh Color Dynamics . . . . . Booklet
Story of Dutch Boy, The . . . . . Booklet

Information for Calculations

Greenlee Handy Calculator . . . . . Card
Lufkin Decimal Equivalents and Drill Sizes . . Chart
Lufkin Thread Card . . . . . Card
Stanley Rafter and Framing Squares . . . . . Booklet

Metals

Copper - How Mined and Refined - Anaconda . . . Booklet
Fundamental Characteristics of Revere Metals . Booklet
History of Copper and Brass, The . . . . . Booklet
Magnesium . . . . . Booklet
Picture Story of Steel, The . . . . . Booklet
Silver for the Craftsman . . . . . Booklet
Steel - From Mine to You . . . . . Booklet
Zinc Industry, The . . . . . Booklet

Miscellaneous Materials

Columbian Pure Manila Rope - How it is Made . . Pamphlet
Drama of Cement Making, The . . . . . Booklet
History of Granite, The . . . . . Booklet
Rock of Ages Corporation . . . . . Pamphlet
Romance of Glass, The . . . . . Booklet
Story of Cellulose, The . . . . . Booklet
Story of Cork, The . . . . . Booklet
Story of Leather, The . . . . . Booklet
Story of Linoleum, The . . . . . Booklet
Story of Manila Fibre, The . . . . . Booklet

Nomenclature

Dual Drive Lathe by LeBlond	Chart
Lathe Cutting Tools	Chart
Modern Back-Geared Screw-Cutting Lathe, The . .	Chart
Regal Lathe by LeBlond	Chart
South Bend Lathe	Chart
Universal Style Milling Machine	Chart

Operational Procedures

Choosing and Using Disston Files	Chart
Disston Hack Saw Chart	Chart
Handwrought Silver	Booklet
How a Disston Hand Saw Cuts	Chart
How to Cut Screw Threads in the Lathe	Booklet
How to Splice Columbian Pure Manila Rope and Columbian Nylon Rope	Booklet
How to Use a Disston Hand Saw	Chart
Instructions for Brazing Fittings to Pipe and Tubing with Easy-Flo	Pamphlet
Making Hand Wrought Sterling Silver Jewelry . .	Booklet
Useful Knots and How To Tie Them	Booklet
Wood Carving for Pleasure	Booklet

References to Standard Dimensions

American Wood Screws	Chart
Greenlee Boring Chart for Wood Screws	Chart
Right Tools for the Right Training, The	Chart
Sixty Degree V - Type Thread Dimensions	Chart

Soldering and Welding

Brazing Carbide Tool Tips with Easy-Flo No. 3 .	Pamphlet
Easy-Flo 45	Pamphlet
Facts on Soldering	Booklet
Principles of Soft Solders and Fluxes	Pamphlet
Sil-Fos and Easy-Flo Booklet	Booklet
Solder and Soldering Technique	Booklet

Specifications

General Specifications on the Use and Application of Shellac	Pamphlet

How to Become a Machinist . . . . . Chart
Thread Forms and Formulas . . . . . Chart
Use the Right Grades of Lumber in Your Home . . Pamphlet

Tool Maintenance

Atkins Saw Sense . . . . . Booklet
Directions for Fitting Narrow Band and Small
Circular Saws . . . . . Booklet
Disston Saw, Tool and File Manual . . . . . Booklet
Disston Wood Turning Chisels . . . . . Chart
How to Repair Broken Cutting Tools with
Easy-Flo . . . . . Pamphlet
How to Sharpen . . . . . Booklet
How to Sharpen and Care for Russell Jennings
Auger Bits . . . . . Pamphlet
Installation, Care and Operation of "Oliver"
Circular Saw Benches . . . . . Booklet
Oiling the Lathe . . . . . Booklet
Proper Installation and Care of "Oliver" Band
Saw . . . . . Booklet

Tools of Measurements

Amazing Story of Measurement, The . . . . . Booklet
Starrett Story, The . . . . . Booklet
Tools and Rules for Precision Measuring, The . Booklet

Veneers

Veneers - A Modern Art 3500 Years Old . . . . . Booklet
Veneers - And So Plywood . . . . . Booklet
Veneers - As Specified by the Architect . . . . Booklet
Veneers - Figure in Wood . . . . . Booklet
Veneers - Their Manufacture . . . . . Booklet

Wood and Lumber

Douglas Fir Lumber - Its Properties and Uses . Pamphlet
Douglas Fir Plywood . . . . . Booklet
Facts About Englemann Spruce . . . . . Pamphlet
Facts About Idaho White Pine . . . . . Pamphlet
Facts About Ponderosa Pine . . . . . Pamphlet
Facts About Sugar Pine . . . . . Pamphlet
Facts About White Fir . . . . . Pamphlet

Facts to Help You Sell Mahogany . . . . . Booklet
Industrial Uses for Douglas Fir Plywood . . . . Booklet
Mahogany Book, The . . . . . Booklet
Products of American Forest . . . . . Chart
Short Talks on Wood . . . . . Cards
Sitka Spruce Lumber - Its Properties and Uses . Pamphlet
Talk About White Pocket Lumber, A . . . . . Pamphlet
West Coast Hemlock Lumber - Its Properties and
Uses . . . . . Pamphlet
Western Red Cedar Lumber - Properties and Uses Pamphlet
Where to Use West Coast Hemlock Lumber . . . . Pamphlet
Wood Materials of Vast Importance to All . . . Chart

Working Drawings

Coffee Table Made from Douglas Fir Plywood . . Pamphlet

APPENDIX B

INDUSTRIAL FIRMS FURNISHING MATERIALS EVALUATED

INDUSTRIAL FIRMS FURNISHING MATERIALS EVALUATED

American Forest Products Industries, Incorporated
American Iron and Steel Institute
American Petroleum Institute
American Screw Company
American Zinc Institute, The
Anaconda Copper Mining Company
Armstrong Cork Company
Atlas Press Company

Barre Guild
Behr-Manning
Bituminous Coal Institute

Carborundum Company, The
Clover Manufacturing Company
Columbian Rope Company
Copper and Brass Research Association
Crown Zellerbach Corporation

De Vilbiss Company, The
Divine Brothers Company
Douglas Fir Plywood Association

Eberhard Faber
E.C. Atkins and Company
E.I. duPont de Nemours and Company, Incorporated

Frederick Post Company, The

Greenlee Tool Company

Hammermill Paper Company
Handy and Harman
Henry Disston and Sons, Incorporated
Higgins Ink Company, Incorporated

J.D. Wallace and Company
Johnson's Wax Products

Kearney and Trecker Corporation
Kester Solder Company
Keuffel and Esser Company

L.S. Starrett Company, The
Lufkin Rule Company, The

Mahogany Association Incorporated

National Lead Company
North Brothers Manufacturing Company
Norton Company

Ohio Leather Company, The
Oliver Machinery Company

Pittsburgh Plate Glass Company
Plymouth Cordage Company
Portland Cement Association

R.K. LeBlond Machine Tool Company, The
Revere Copper and Brass, Incorporated
Rock of Ages Corporation
Russell Jennings Auger Bits

Shellac Information Bureau, The
South Bend Lathe Works
Stanley Tools

Veneer Association, The

West Coast Lumbermen's Association
Western Pine Association

Yates - American Machine Company

APPENDIX C

THE QUESTIONNAIRE USED IN THE STUDY

Title:

1. Is the size of the type conducive to easy reading?

YES___ NO___

2. Is the grade of paper upon which it is printed satisfactory for school use?

YES___ NO___

3. Is this material attractive?

YES___ NO___

4. If in color, do the colors used make this material more attractive?

YES___ NO___

5. Do you believe the size of this material is a handicap to its use?

YES___ NO___

6. Do you think the information included in this material could best be presented by:

___a. Lectures by the instructor

___b. Study assignments and student reports

___c. Voluntary reading by the student

___d. Other (please list)_____

_____

7. Do you think the use of instruction sheets would add to the value of the information contained in this material?

YES___ NO___

8. What grade level do you consider this material best suited for?

___ elementary grades ___ college

___ junior high ___ other _____

___ senior high

9. Is the information too technical to be of educational value to the students of the grade level suggested?

YES___ NO___

10. Is this information related to student experiences in the Industrial Arts?

YES___ NO___

11. Do you think this information could be better presented in another form? (Booklet, Chart or Pamphlet)

YES___ NO___

12. In which of the following classifications would you place this material?

___a. Has direct bearing upon the efficiency in performing work.

___b. Has to do with increasing the general scope of vision of the learner.

___c. Material leads to occupational information and guidance.

___d. Other (please list) _____

_____

13. Do you think the material up-to-date?

YES___ NO___

14. Is the technical information interrupted excessively by sales material?

YES___ NO___

15. Is the amount of advertising in this material enough to make it objectionable?

YES___ NO___

16. Please give any suggestions or comments you have relative to the uses or values of this material: