THE SELECTION OF TEXTBOOKS FOR INDUSTRIAL ARTS

A Rating Technique to Select Material for the Industrial Arts Profession

A Thesis Presented for the Degree of Master of Arts

by

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Approved by: [Signature]

Adviser
PREFACE

Industrial arts teachers are faced with the problem of selecting reference or text books for their planning centers or classes. What sort of a technique or method do they use to select the best material available? A search of current and past literature pertaining to this problem reveals a wealth of information, but only in one or two cases has it been compiled in a form that would help an industrial arts teacher.

This study is a compilation of the information in a form to help industrial arts teachers make a wise selection of textbooks. Many rating scales prepared for other subject areas were reviewed to determine their scope. Then, further data were assembled to supplement insufficient sections and to attempt to objectify the rating of textbooks to an appreciable extent.

The guidance and direction of Dr. William E. Warner was of immeasurable help in carrying out this study. His broad experience, as an author and as an educational consultant, gave his constructive criticism special merit. His kindness in extending the use of his private library, placed at my disposal many textbooks that would have been difficult to acquire from other sources.

The section on readability was developed under the auspices of Dr. Edgar E. Dale, head of the Curriculum
Division in the Bureau of Educational Research, and members of his staff.

Four publisher's representatives, twenty-four leaders in industrial arts, and twenty-five teachers kindly contributed their time and analytical ability to evaluate the tentative rating scale.

The assistance of my wife in typing letters and editing preliminary copy is greatly appreciated.

Harold G. Gilbert
"Analysis of a book without a guide is analogous to sailing without a compass."

-Maxwell, The Selection of Textbooks
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Chapter I

NEED FOR A RATING TECHNIQUE

A planning center with a wealth of reference material is generally accepted today as an indispensable feature of a well-organized industrial arts laboratory. It was declared essential by the United States Office of Education Bulletin #34 (65, p. 55)* which said:

The time has now arrived when a library of good books is an essential part of the equipment of every progressive industrial arts shop, and evidence of their frequent use is an indication of one factor in good teaching.

The library being established, the problem of selecting books for it arises. The supervisor of the library is delegated this responsibility by Donaldson (20, p. 28) in his master's thesis on The Industrial Arts Library. He says that:

In this capacity he can do a valuable service to the school through a wise selection of such materials. A personal investigation should be carried out by him in order to secure the best material available in view of the appropriation.

The selection according to the above statement is no light responsibility, or is it an easy task. In most schools the industrial arts teacher will be the supervisor of the library. Williams (73, p. 344) considers the method used

* Figures in parentheses are numbers of references in the Bibliography. See page 117. This form of notation will be used throughout this paper.
by industrial arts teachers to rate a book, and counsels:

To choose wisely implies that more discrimination is needed than for one to simply exercise a rule of thumb judgement. Most of us are prone to glance at a book and to leaf casually through its contents, noting the most obvious features of its appearance without taking into consideration the criteria on which a textbook’s value is based.

That brings out the problem of providing the industrial arts teacher with material to use in an objective analysis of a book. Coltharp (13, p. 44) gives an indication of the nature of this material by stating:

Obviously certain factors such as readability, attractiveness, suitability, and general utility are present to a greater or lesser degree in all textbooks, but teachers in the field are faced with the problem of evaluating and selecting books with few or no definite standards.

The teachers need some specific factors or standards to compare books they select, if their judgments are to become worthy of the great responsibility placed upon them. A method has been developed for recording a series of different evaluations which contribute to a more objective decision regarding the value of a book. Jensen (32, p. 143) calls this method the use of a score card, about which he proclaims:

...all selecting agencies have a score card, in the general sense of an evaluating scheme, but not all selecting agencies have a well-defined score card.

These score cards or checking lists are guides for studying or evaluating textbooks. The result is a series of judgements which make for a more definite and detailed consideration of textbooks than is possible without them.
Score cards have been prepared for several subjects. Hall-Quest (27) has prepared quite a few, using different ones for history, arithmetic, geometry, mathematics, physics, reading, spelling, and languages. Jensen (32) set up score cards for arithmetic, language, reading, history, spelling, music, geography, and physiology. They all follow the same general pattern but are adapted to the peculiar needs of the different subjects. Coverly (14, p. 273) emphasizes this practice in saying that:

... as long as milk is measured by the quart, eggs by the dozen, and sugar by the pound, it is not probable that we shall be able to measure English books and mathematics books, or even literature and language books, in the same scale.

Industrial arts literature is no exception to this rule, as it too, has peculiar features that should be considered in judging books.

**Score Cards for Industrial Arts.** Careful search showed that only two score cards have been prepared for industrial arts. Williams (73) made quite a thorough study and produced a score card listing twenty items. The book being rated was given from zero to five points for the degree it measured up to perfection in each item. A negative and a positive statement about each factor were designed to assist the teacher determine the value to be assigned; for example, Williams (73, p. 346) uses this statement as the positive one for type size:

The type face is of convenient size for rapid reading. Heads and subheads have proportionate contrast to the sentences and paragraphs.
The teacher is left to exercise subjective judgment as to a convenient size of type. Other statements also required subjective judgment. Coltharp probably would regard this as one of the indefinite standards that teachers face. Williams devotes only two or three questions to such items as typography, illustrations, and readability. It is doubtful if these can be covered adequately in such a brief treatment.

The other score card for industrial arts was compiled by Coltharp (13). He drew upon a very limited number of sources for his material. Also, the scope, and the degree of objective judgment is again questionable.

Arguments Against Score Cards. Maxwell (39) presents four reasons why some of the score cards used in the past have not been acceptable. Accompanying each reason is a statement showing how these pitfalls have been avoided in this study.

1. We do not have justifiable material for the formulation of a score card. An inspection of the material in Chapter IV should refute this claim.

2. Criteria used represents the judgment of individuals and has no scientific basis. This has not been avoided in total but in every possible situation it has. The sections on typography, readability, and illustrations are largely the results of scientific research.

3. Weighted items are the opinion of the formulator and not of a large group. Weighted items are not used in
this study because means of formulating weights were not available.

4. Some publishers formulate them to insure selection of their own product. A survey of the comments made by four publishers in Chapter V would refute this.

Publishers are very critical of the preparation of score cards as their material is often purchased on the basis of score cards ratings. Jensen (32, p. 136) made a survey of several publishers and summarized their comments as follows:

(1) Score cards are made up with some one textbook in mind. (2) Teachers fill in score cards to make the result tally with their real opinion. (3) Score cards too often prove what the maker of score cards wishes to prove. (4) It is possible for a book to score high and still not get good results in the classroom. (5) The ideal score card will be a composite score sheet made by educational experts, classroom teachers, and publishers.

Each of the above items may be considered in the light of this study:

1. Chapter IV gives the material used and Appendix B lists the books used in developing this material.

2. The instructions given to the user of the score card as shown in Chapter VI tends to overcome this.

3. Validation by the large, experienced jury should overcome any of this.

4. This may be true but it seems to be an exceptional case.
5. The careful selection of the jury for validation brought in these three groups.

A Rating Technique. Working on the assumption that every industrial arts laboratory should have a library or a collection of reference materials, the teacher or supervisor is faced with the task of carefully selecting textbooks. A rating technique or score card may be used to assist teachers to make a more objective judgment. Maxwell (39, p. 149) believes:

The better the score card, the better the final conclusions. Analysis of a book without a guide is analogous to sailing without a compass.

This study will undertake the preparation of a good score card to guide industrial arts teachers in selecting the best material available for their use. The next chapter will describe the method used in its development and validation.
Chapter II
PROCEDURE FOR STUDY

The method used to undertake a study will, to a great extent, characterize the results. For this reason a careful plan of attack is vital to the value of the results.

Developing a Method. The need for a rating technique has been established, so the method of developing it is the next logical step. The National Council of Teachers of English have studied the problem of rating textbooks, and established a policy concerning the preparation of rating techniques. Coverly (14, p. 267) in reporting for the Council states:

We are in favor of any method that will result in a serious, fair appraisal of the book. There is too much reliance on casual examination of books; an attractive cover, a few pretty pictures, and one or two unique features too often determine a sale.

A method requiring a thorough, careful inspection of many phases of the book seems to be necessary to avoid casual examination.

DEVELOPING A RATING TECHNIQUE

A thorough examination of a book seems to call for a specific plan to follow; to ascertain the value of many features. Weber (70, p. 678) makes the following suggestions:

The first step toward the analysis of a textbook, as a basis of selection for
school use, seems to have been the preparation of lists of desirable qualities, to be used as guides in arriving at estimates of the relative value of the textbooks examined.

**Sources of Information.** The search for desirable qualities was conducted using the extensive library facilities of The Ohio State University. To start out, the card catalog was inspected for all references and cross-references to the following topics:

<table>
<thead>
<tr>
<th>Authors, assistance for</th>
<th>Publishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books, evaluation of</td>
<td>Publishing Houses</td>
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<td>Books, selection of</td>
<td>Rating Scales</td>
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<tr>
<td>Drawing</td>
<td>Readability</td>
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<tr>
<td>Ease of Reading</td>
<td>Reading</td>
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<tr>
<td>Evaluation of Books</td>
<td>Score Cards (Books)</td>
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<tr>
<td>Illustration of Books</td>
<td>Textbooks</td>
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<tr>
<td>Printing</td>
<td>Writing Books</td>
</tr>
<tr>
<td>Publishers</td>
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The bibliographies, given in each reference book used, were inspected for other sources of information.

**The Reader's Guide to Periodical Literature** was surveyed to find articles published in the last fifteen years on any subject listed above. Several articles were found under the headings of Manual Training, Textbook Selection, and Textbook Illustration.

**Other Sources.** Little information characterizing illustrations for industrial arts textbooks was found in the literature. In order to supplement it, a survey was made of the newest books published that contained exemplary illustrations. The books recommended by Dr. William E. Warner for this purpose were: *Household Mechanics, Metalwork, Pewter,* and *Your Craft Book.*
Dr. Edgar E. Dale and his staff at The Ohio State University are making an extensive study of readability in books. They kindly provided assistance and advice in developing this topic.

The results of inspecting literature pertaining to textbook evaluation are reported in Chapter IV.

VALIDATING THE RATING TECHNIQUE

The material presented in Chapter IV was drawn together to produce a tentative rating technique that could be used by industrial arts teachers to evaluate textbooks. It may be found in the first part of Chapter V. Inasmuch as this scale was prepared by the writer, it would be accepted with reservation by Coverly (14, p. 219) who mentions:

...any score card divided by an individual or small group of individuals is liable to be inaccurate because there is an insufficient number of judgments as to the items which should be included.

Method of Validation. The value of making a score card is lost unless it has been proven valid to the satisfaction of people who will use it. Otis (45, p. 132) overcame this difficulty by having more than one hundred teachers, principals, supervisors, and superintendents make suggestions, and weightings. Jensen (32, p. 136) used the publishers' criticism as well as that of educational experts and classroom teachers.

Questionnaire. A method following that pattern was used in this study. A list of judges was compiled from
three groups:

1. Four publishers' representatives.
2. Twenty-four national leaders of industrial arts.
3. Twenty-five experienced teachers of industrial arts.

A letter (see App. C) was prepared to accompany the copies of the Tentative Rating Technique sent to the publishers and national leaders of industrial arts. A list of the latter two groups including their respective positions may be found in Appendix C. Experienced teachers of industrial arts were reached through a class of graduate students at The Ohio State University. When the class was approached to make an evaluation, the problem was presented in the same manner as in the letter to national leaders of industrial arts.

A survey of all the criticisms is presented in Chapter V. As a further test of the value of the tentative form, textbooks for industrial arts were evaluated using it. One book was taken from each of the publishing houses catering to industrial arts. The books were taken from the Industrial Arts Laboratory Library at The Ohio State University. Other factors governing the choice of books are listed in Chapter V.

Implications. The criticism by the group of judges and the evaluation of books being completed, the rating technique was revised according to the results of the tests. The reasons for the revision and the revised form are in Chapter
VI. The conclusions in Chapter VII give some of the implications of the rating technique for the industrial arts profession.
Chapter III

THE PROGRAM OF INDUSTRIAL ARTS AS A BASIS

The need of writing a different rating scale for each subject was indicated in Chapter I. The program of industrial arts is studied in this chapter to discover the peculiarities of the subject that may affect a rating scale.

NECESSITY FOR STATING PROGRAMS

The selection of textbooks is closely related to the program of the subject for which the books are used. For that reason, it would be exceedingly difficult to undertake the study of criteria for textbook selection without first developing an outline for the program. Rader (49, p. 300) expresses this point by stating:

A scientific selection of texts is most improbable, if not impossible, without a genuine course of study as a starting point.

A course of study may be considered as the application of a program to a particular teaching situation. The broad interpretation is used for this study because the rating technique is intended for any industrial arts textbook, not alone those for one particular teaching situation.

Weber (70, p. 684) uses a different form of expression to show the need to start with a statement of the program. He says:

The scientific selection of textbooks is closely connected up with the determination of the minimal curricular content.
He does not indicate the program need to be set up first, but emphasizes the relation of the curricular content or program to the selection of textbooks. Spaulding (56, p. 3) uses this striking metaphor to relate textbooks with the program:

Textbooks are tools. To be serviceable, they must be adapted, like other tools, to the three considerations: the end to be accomplished by their use, the material in connection with which they are to be used, and the needs of the user.

These three factors are embodied in outlining a program for industrial arts. The ends to be accomplished are stated in the function or purpose of the program. The material is an expression of content, and the needs of the user are specified in describing the program applied to various levels.

THE PROGRAM OF INDUSTRIAL ARTS

The study of industrial arts is accepted as a part of general education for boys and girls in the present day schools. Industrial arts may be analysed for closer scrutiny by dividing it into three phases: the psychological, the cultural, and the social-economic phases. Each of these may in turn be studied to see what contribution they make to the subject as it should be taught.

Individual Nature. People living and working together have created the society that governs their actions. An analysis of these people from a psychological viewpoint may help to understand better how industrial arts contributes
to a study of this society. People are spurred into action by what psychologists call basic drives. Dockery (19, p. 128) explains a drive as:

...any persistent stimulus that results in some sort of activity until the stimulus ceases to be effective.

Any activity of an individual may be studied and found to be caused by basic drives. Psychologists do not agree upon any one list of basic drives. The following list is compiled from a study of books by Dockery (19), Reich (50), and Woodworth (74):

- air
- hunger
- maternal
- anger
- pain
- appetite
- sex
- exploration
- skin conditions
- hunger
- thirst
- fatigue

This list of basic drives indicates the composition of the society. They describe the needs and wants for activity that an individual is stimulated to satisfy; therefore, this list of basic drives is an essential consideration in developing an industrial arts program.

The basic drives are actually the reasons for activity. The nature of this activity is described by Bonser (4, p. 12), (5, p. 33) as these four native impulses which have universal application:

The Manipulative Impulse - a tendency to find much satisfaction in handling materials, and tools that are used to modify the forms of materials.

The Investigative Impulse - a tendency to be curious, to desire to know how, why, what for, and all about the operation of whatever the environment affords.
The Art Impulse - a tendency to find satisfaction in form and color, expressing an active phase in combination with the manipulative impulse.

The Social Impulse - a tendency to find satisfaction in sharing the interests and activities of others; to have others share one's own activities.

These four impulses should be taken into consideration in planning the activities for an industrial arts shop to make the work more vital to the individual. They are natural tendencies that any individual has. It would be easier to take advantage of them rather than to attempt to create artificial stimulants for desired action.

The basic drives define the needs and wants of individuals in our society, while Bonser's statement of four native impulses clarify the nature of their activities.

Material Cultures. Not all of the individuals in society take full advantage of the opportunities offered to live the fullest, richest life possible. This thought was emphasized in A Prospectus for Industrial Arts in Ohio (44, p. 38) where it is written:

While everyone is exposed constantly to stimuli from materials with which he is in contact, few are able to appreciate fully the meanings associated with those stimuli.

This opportunity for fuller appreciation is important because it occurs often in everyday living. It deals with objects used many times a day; such as, furniture, silverware, or china. People may learn to use these objects by trial and error if not by other more efficient methods. If the objects merely provide a service when they are used,
life remains comparatively narrow and dull. The United States Office of Education Bulletin #34 (65, p. 8) tells of other daily associations that can be made:

Some one has been stimulated to coin the expression consumer literacy to indicate intelligence necessary for efficiency in the selection, care, and use of industrial products and services.

Industrial arts, when dealing with consumer literacy, tends to enrich associations with objects in everyday life, by presenting a wealth of material concerning the wise selection and care that would stimulate the proper use of the objects. Closely related to the proper selection is the development of good taste through a study of the historical and functional perspective.

Consumer literacy is the term applied to a study of the culture people can create by the proper use of the material objects of their environment.

Technology. The true nature of society has not as yet been considered, although it has been pointed out that it was developed from individual contributions. These individuals were stimulated by similar basic drives to form a pattern for present day society. This pattern has been studied by Dewhurst and his associates (18, app. 32) who record these statistics:
PERCENTAGE DISTRIBUTION OF ENERGY OUTPUT

<table>
<thead>
<tr>
<th>Year</th>
<th>Human</th>
<th>Animal</th>
<th>Mineral, Fuels, and Water Power</th>
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</thead>
<tbody>
<tr>
<td>1860</td>
<td>14</td>
<td>79</td>
<td>7</td>
</tr>
<tr>
<td>1870</td>
<td>15</td>
<td>73</td>
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<td>1880</td>
<td>14</td>
<td>69</td>
<td>17</td>
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<td>1890</td>
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<td>1900</td>
<td>11</td>
<td>51</td>
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<td>1910</td>
<td>8</td>
<td>35</td>
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<td>1920</td>
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<td>1930</td>
<td>5</td>
<td>12</td>
<td>83</td>
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<tr>
<td>1940</td>
<td>3.6</td>
<td>6.4</td>
<td>90</td>
</tr>
<tr>
<td>1950</td>
<td>3</td>
<td>3</td>
<td>94</td>
</tr>
<tr>
<td>1960</td>
<td>2.4</td>
<td>1.3</td>
<td>96.3</td>
</tr>
</tbody>
</table>

Careful inspection of this table will show that there has been a drastic change in the type of society. One hundred years ago, animal power was the primary source of energy. Then as decades passed, the chief source of energy output became minerals, fuels, and water power. Mumford (42) and Rugg (53) have written books on the development and the significance of this new type of society, which they have named the technology. As indicated in the above table the chief characteristic is the production of material goods by a highly scientific, machine process.

The significance of this technological society for the individual is emphasized by Dr. Clark (12, p. 11) who says:

As the level of our technology rises, the average person must obtain more and more skill to get along well.

Dr. Clark continues by pointing out that the average person will need to apply this skill to his everyday life as well as to his vocation.
Certainly, education today cannot fail to reflect an interpretation of a predominantly technological society, and industrial arts is in a favorable position to take the lead. In order to do this, industrial arts must modify and revitalize its program. To give a definition of this new program the Industrial Arts Teacher (1, p. 4) indicates that:

In short, a good definition needs to identify the principal functions of industrial arts and then to indicate how they should be applied at various levels, through what types of subject matter, with what varieties of methods, in what kind of physical setting, and then perhaps gratuitously, in what perspective.

This chapter will continue to unfold a program for industrial arts by following the above definition. It is based on three sources of material:

1. The Industrial Arts Teacher, Vol. 6, #3 (1, p. 4)
2. The Industrial Arts Teacher, Vol. 6, #5 (15, p. 1)
3. The New Industrial Arts Curriculum (2)

The material in these three references is not quoted directly, but interwoven and adapted to this statement of purpose.

Function of Industrial Arts. The previous three sections emphasized the point that society is fundamentally technological and results from the composite actions of all of the people. Therefore, when industrial arts interprets the technology to members of both sexes, it is founded on scientifically and educationally sound principles.

A threefold approach to this interpretation is used:
1. The section on material cultures showed the need for people to become intelligent consumers.

2. Dr. Clark indicated the need for people to become skilled producers.

3. The need for developing recreational opportunities is illustrated by Bonser's statement of four native impulses.

**Scope.** The section on individual nature listed the individual's needs and wants that affect the program of industrial arts. Inasmuch as these needs and wants vary at different age levels, the program should be adapted to this variation.

Activities of historical significance may be used at the childhood level. That would lead into an orientation to the present technology for the junior high school. The guidance program would require major emphasis on the senior high level. In colleges a more technical and thorough study of phases of the technology could be made. The adult program would have need for consumer and recreational emphasis.

**Content.** The social-economic analysis of the society, treated in the section on technology, has replaced the old job or trade analysis to provide the content for industrial arts. The references indicate this study of the technology may be grouped under five divisions:

1. Power - natural, electrical, thermal, and atomic
2. Transportation - land, sea, and air
3. Communication - composition and duplication, transmission and reception, and interpretation
4. Construction - homes, highways, factories and public buildings, airports, and waterways

5. Manufacturing - materials, fabrication, and consumption

Methods. Good teaching methods are based on the psychological makeup of the individual as described in the section on individual nature. This calls for a variety of methods including careful planning, student operated personnel organization, the work experiences as means to an end, extensive audio- and visual-aids, organized field study, research, and creative expression.

Physical Setting. A shop layout should include facilities to permit manipulative, investigative, and planning activities in each of the five divisions of content. However, currently well developed settings will require very little adaptation to handle this program if adequate storage space is available for models and the many other instructional devices required.

Industrial arts contributes to general education by orienting the student to living in a fundamentally technological society as a consumer and a producer. The material objects of the student's environment are analysed to appreciate their place in the cultural pattern. The student's nature and characteristics are considerations to guide the activity.

A dynamic program of this type must be ever cognizant of new developments in this scientific age. Keeping
abreast of them calls for literature that is constantly revised and evaluated to meet the changing needs.

Specifically, the section of Chapter IV on Adaptability and the first section of Chapter V will show how the rating technique makes use of the purposes of industrial arts to govern the selection of textbooks.
Chapter IV

FACTORS IN DEVELOPING A RATING TECHNIQUE

A classification of the factors used in developing a rating technique seemed to be necessary to organize the material. Rating scales that use a topical breakdown are those by Dawson (27), Maxwell (39), and Rader (49). Although each uses several main headings there is no widespread agreement as to specific headings or the order in which they appear. In view of this lack of specific direction, a logical approach to the selection of factors has been developed.

General Information, when placed at the top of the rating scale, provides specific items to identify the book. A study of the content and organization explains what subjects are covered and indicates what aids there are to find information in the book. Then, before any time is spent in studying specific details, the question of the adaptability of the book to the teaching situation is raised. If the information can be used, then further study of the quality of presentation may be made by studying typography, illustrations, and readability.

This chapter will present some of the more significant features of rating scales used in the past. The factors listed above will be used as topics to classify the material.
GENERAL INFORMATION

A few facts about a book are necessary to identify it and procure it for use, either from a publisher or from a library. There is general agreement among the rating scales presented as to what general information should be used. The following table is compiled from the factors listed by three men:

<table>
<thead>
<tr>
<th></th>
<th>Williams (73, p.346)</th>
<th>Fowlkes (23, p.10)</th>
<th>Maxwell (39, p.78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Date of Publication</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Edition</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Experience of Author(s)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Grade Used For</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Number of Pages</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publisher</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Publisher's Address</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Training of Author(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Williams listed most of the items as did the majority of the men who devised scales. Fowlkes goes to one extreme of listing detailed and inclusive information. Maxwell goes to the opposite extreme of listing only the bare essentials.

General information is the one factor that authors of rating scales nearly agree upon. The manner of treatment of other items in this chapter shows a much wider divergence of opinion.

CONTENT AND ORGANIZATION

The content of a book refers to the facts or knowledge presented, while the organization includes helps or aids to locate the particular part of the content being sought.
First Consideration. A survey of the content and organization is the logical problem to consider after the general information is recorded. A textbook is used as a source of information in teaching, so the first thing to look for is the information that is included. Even if the information is present it must be organized in such a manner that people using the book can find the part for which they are looking. Maxwell (39, p. 62) emphasizes this importance by stating:

Standards should be first applied to the content and organization of the textbook. A book fulfills its purpose through its content. The author conveys his message through the material he incorporates in his book. If his organization is effective it will make his purpose clear.

Other rating scales are not unanimous in placing a content study first. Franzen & Knight (24, p. 81) place it fourth, Dawson (43, p. 154) places it third, and Fowlkes (23, p. 12) places it second. The fact remains that all of them use a content study even if it is not placed at the top of the list.

Author's Prefatory Statement. The purposes listed by the author give an indication of what the content of the book may be. Maxwell (39, p. 63) gives this word of warning about the use of this feature:

The purpose of an author is frequently indicated by his statement in the preface. The preface usually gives his point of view, but a much further analysis must be made in order to note whether or not he has been consistent in developing his point of view.
This statement by the author provides a convenient method of noting what may be found in the book. At least it will provide some points to look for when inspecting the book. Fowlkes (23, p. 13) also lists author’s purpose in his rating scale.

**Content Survey.** An analysis of the content from the table of contents is a technique used by Fowlkes (23, p. 14) to provide a mechanical means of inspecting the topics treated in a book. He used a table to list the topic, the number of pages in the book devoted to that topic, and the percentage of the book the topic includes. Of course, this is only used as a means of tabulating the topics covered. The most important fact to note is whether the topics given in the table of contents are actually treated in the book. However, listing the topics in tabular form facilitates the actual search for validation. It also indicates if the table of contents is well organized.

**Aids in Using Textbooks.** Textbooks are often used to find information on a topic covered by only a part of the book. In that case it is necessary to locate the desired information in the book. Fowlkes (23, p. 17) uses a very inclusive check list for these features. He looks for:

- Appendices  
- Bibliography  
- Footnotes  
- Glossary  
- Indices  
- Marginal Notes  
- Paragraph Headings  
- Table of Contents  
- Summaries  
- Titles to Illustrations

This list is by far the most inclusive used by any rating scale. Franzen & Knight (24, p. 83) assign only
minor attention to organization, mentioning marginal notes and indices. Maxwell (39, p. 82) and Dawson (43, p. 157) mention organization but give no descriptive features of it. Rader's (49, p. 302) mention of the mechanical aspect might be construed to include organization. Hall-Quest (27, p. 83) is quite explicit in treating this matter and writes:

A good textbook should include such organization of essential significant facts as meets the requirements of unity, definiteness, and proportion.

He considers unity to be the relation of facts to each other and their grouping in definite relation to the whole. Definiteness, to him, means a good introduction, a synopsis to each unit, and a strong conclusion. Proportion covers the space allotted each unit in relation to its importance. These three items, while expressed in a different manner, are closely related to the aids listed above. These aids are mechanical expressions of unity, definiteness, and proportion.

The book, A Few Suggestions to McGraw-Hill Authors, emphasizes the importance of several items listed by Fowlkes. Regarding them (40, p. 6) it states:

Detailed tables of contents to run in the front of the book serve a useful purpose. When the chapter headings with the outstanding sub-headings listed underneath are selected carefully they give a quick but comprehensive picture of the contents.

The outstanding subheadings mentioned may be considered similar to the terms, marginal notes and paragraph headings, listed by Fowlkes.
Williams (73, p. 346) in his score card for industrial arts books, mentions only part of the aids listed by Fowlkes; namely, table of contents, glossary, index, and reference bibliography. He then gives an aid peculiar to the needs of industrial arts: projects, plans, and specifications.

Quality of Presentation. The mechanical features of organizing material in a book have been considered so far. To make a thorough inspection, the quality of organization should likewise be evaluated. Regarding quality, Maxwell (39, p. 64) is quite positive in stating:

The text must be free from bias or dogmatism.

Bias may be considered the presentation of information in such a manner that the reader may gain the wrong impression; for example, the author may tell one way of doing something and give the reader the feeling that it is the only way it can be done, when there are other acceptable methods. Dogmatism may be practiced by saying a process must be carried out in a certain manner when there are other good ways of doing it. If either of these undesirable traits are present the quality of the presentation is greatly reduced.

The date of publication was listed under general information. That is not an infallible indication that the quality of the material is up-to-date. The author may use material pertinent to an earlier time than the date the
book is published. For that reason, Rader (49, p. 302) and Williams (73, p. 346) make a special point of finding out if the material is up-to-date.

Validity and reliability are two terms used by Fowlkes to establish certain aspects of the quality of the material in a textbook. In order to procure a rating on these items he asks if there are any errors in fact or statement throughout the book.

**Rating a Textbook.** The rating scales or techniques previously prepared show the prime importance of considering content and organization when rating a textbook. These two factors may be rated in a subjective or an objective manner. For the latter method such features as the author's stated purpose, proportion of space for various topics, and the number of aids for using the book are considered. A more subjective rating is necessary to analyse the quality of the material presented.

The next factor, adaptability, ties in rather closely with this analysis of content and organization.

**ADAPTABILITY**

The information presented in a book is of little value unless it can be used in the teaching situation. If a book is to be given a good rating it must be adaptable to the program presented. This program for industrial arts has already been discussed in Chapter III.
Correlation. Franzen & Knight (24, p. 84) place a good deal of weight on the correlation between material presented in the textbook and other school subjects. The pupils develop from all of their school contacts, and it would aid them if any unnecessary conflicts were removed from their reading material. This aspect would call for assistance from the supervisor and other teachers.

Correlation with other subject matter of the program is also considered essential by Maxwell (39, p. 81) and Franzen & Knight. The industrial arts teacher may consider this when he selects textbooks to supplement the program he plans as discussed in Chapter III.

Other Expressions Used. Each rating scale uses different expressions to determine the adaptability of a textbook. Franzen & Knight (24, p. 82) mention:

Use of material known to student
Possibility of related demonstrations

Rader (49, p. 302) inquires about work of local interest and adaptability to the situation. Maxwell (39, p. 82) and Williams (73, p. 346) ask if it meets the needs of the user, if it can be adapted to the course of study, and its type of use. Otis (45, p. 134) presents the following subtopics under local adaptability:

A. Supervision  D. Class
B. Teaching      E. Equipment
C. Children      F. Term

These subtopics are concerned with the method of presentation in the school where the textbook is used. The
method for presenting a program of industrial arts is considered on Chapter III.

Fowlkes (23, p. 30) uses these questions concerning adaptability:

A. Do you think the book fulfills the purpose stated in the preface?
B. Do you think this book could be used to advantage?
C. What type of use does the book have?

The Sole Test. A survey of all the aspects of the problem discussed above may be summarized in a statement by Maxwell (39, p. 23):

The sole test should be the adaptability of the text to meet the needs of a particular school system.

That is what this section on adaptability attempts to bring out: how well the content of the textbook fits the school situation. If that answer is positive, the rest of this chapter will provide other tests to rate the manner in which the material is presented.

TYPOGRAPHY

The scope of typography is very well expressed in A Manual of Style used by The University of Chicago Press (66, p. 3). In discussing the general considerations for planning a book it proclaims:

A book is planned to present the thoughts of its author in a form which shall be easy to read, pleasing to the eye, and appropriate to its subject matter. All typographical principles and rules should be directed to these ends.
This section will treat the problem of testing the typography of a book to see if it is easy to read, pleasing to the eye, and appropriate to its subject matter.

**Former Methods.** Typography has been considered in most rating scales under the heading of Mechanical Elements or Mechanical Features. A survey of five of these scales is tabulated on the following page (table 1). Rader's scale was not included because he merely indicates the heading of Mechanical Features with no subtopics listed.

Inspection of this table will show a lack of specific standards to judge a book. The different items are mentioned and the person rating the book is left to make a subjective estimate of how well the book measures up to acceptable standards. This places a large value on the opinion of the judge.

Williams (73, p. 346) gives the judge this positive factor about the type face:

> The type face is of convenient size for rapid reading. Heads and subheads have proportionate contrast to the sentences and paragraphs.

Even this statement calls for subjective judgement concerning the "convenient size" and the degree of "contrast". There is no indication except the opinion of the judge regarding an acceptable or even exemplary standard.

**Paterson and Tinker.** A research was made in this field of typography for more specific standards to use. This was not carried very far before it became evident that
<table>
<thead>
<tr>
<th>Elements</th>
<th>Dawson (29, p.154)</th>
<th>Powikes (11, p.28)</th>
<th>Fraenzen &amp; Knight (12, p.81)</th>
<th>Maxwell (26, p.78)</th>
<th>Williams (46, p.346)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attractive Cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binding</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Length of Lines</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printing Clearness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printing Size</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Shape</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Size and Clearness (Footnotes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Size and Clearness (Indices)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spacing Lines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spacing Paragraphs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spacing Words</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Width of Margins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
the work of Paterson and Tinker carried much weight. Donald G. Paterson was a professor of psychology at the University of Minnesota. His co-worker, Miles A. Tinker, was an associate professor at the same University. In their twelve years of research they gave speed of reading tests to 33,031 people. Each phase of their experiments was published in the *Journal of Applied Psychology*, Volumes 13 to 20, from 1929 to 1936. These reports were called "Studies of Typographical Factors Influencing Speed of Reading". Tinker also wrote some articles on this subject with H. A. Webster.

The work of Paterson and Tinker is widely accepted by other psychologists working in this field. Harold J. McNally of The Teacher's College, Columbia University uses their technique in his dissertation study. This was sponsored by Dr. Arthur Gates and Dr. Robert Thorndike of Columbia.

Some of the material of Lukiesh and Moss, co-workers eminent in the field of typography and illumination, is used by Paterson and Tinker to support their findings. They finally compiled the results of their work and published it in one book, *How to Make Type Readable*, in 1940.

**Readable Type.** The studies of Paterson and Tinker characterize a significant trend in typography. They (47, p. 1) describe it by saying:
Type designers are now talking about streamline typography. The emphasis thus shifts from the traditional stress on mere beauty in type form to the production of styles of type that will meet the demand for speed in all phases of contemporary life.

This leads to the question of what style of type can be read faster or easier? It is answered by Paterson and Tinker (47, p. 2) when they state:

Readability of print as influenced by size of type, style of type face, quality of printing surface, and other factors will not only prevent or reduce fatigue and feelings of eye strain but may also facilitate the speed with which the printed material can be assimilated.

Here are the factors that the rating scales deal with in a very subjective manner. By scientific experiment Paterson and Tinker produce evidence that can be used to deal with these factors in a more objective fashion.

**Method of Experimentation.** The recommendations of these two psychologists are so revolutionary that it would be difficult to appreciate their validity unless the scientific method of study they used is understood. The method was to establish the ease of reading comparative samples by using a Speed of Reading Test designed by Chapman and Cook (11). Several experiments were conducted to determine the accuracy of the tests for the purpose Paterson and Tinker used them.

These men soon found no one factor could be studied alone. They had to be considered as combinations. Some of the other important precepts involved in these experiments were:
1. Eighty or more people were tested for each comparison.

2. Appropriate statistical methods were used.

3. Each person read sufficient material to prove results.

4. Test forms were printed according to standard printing practices.

5. Normal reading conditions were preserved.

6. Illumination was uncontrolled - ordinary homes and classrooms were used.

7. No attempt was made to select "perfect" eyesight.

This is not a complete report on the method of experimentation, but an attempt to show their objective approach to the study.

Recommendations. The experiments were conducted with a practical purpose in mind. From the outset Paterson and Tinker (47, p. 11) knew:

It is one thing to lay the foundation for a scientific typography and another to get the findings accepted by the printing industry.

The practical application of the results was a constant factor in designing the comparative factors that were tested. This is evidenced from their (47, p. 137) statement that:

In setting up our test materials for this study we have not attempted to produce impossible printing arrangements. Rather we have kept within reasonable limits so far as printing practice is concerned.

The degree of their success in attaining possible arrangements may be judged by inspecting the "Tabular Sum-
mary of Typography Recommendations" quoted on the next page (table 2). As the title infers, the results of all the tests were compiled to present the concluding recommendations. They are specific enough to bring the typography section of a rating scale from the realm of subjective judgement to objective study.

Kind of Paper. Stanton in his master's thesis at The Ohio State University adopted the method used by Paterson and Tinker to study *The Influence of Surface and Tint of Paper on the Speed of Reading*. After performing several tests Stanton (57, p. 28) draws this conclusion:

The results show that antique finish yields a greater speed of reading than glossy and dull-coated stocks, and that the tint of ivory also increases the reading speed.

Paterson and Tinker link speed of reading with ease of reading, as indicated in the first part of this section, so Stanton's discovery would be applicable to both.

Textbook Covers. Williams (73, p. 346) makes this statement regarding the best cover for industrial arts books:

The textbook has a durable cloth cover, and the manual and/or workbook has a flexible or spiral binding.

Other writers do not agree with the use of flexible or spiral binding. Sachs (52, p. 2242) presents this argument against their use:

Since the convex surface of a page may result in eyestrain, it is suggested that books be bound to open flat.
TABLE 2
TABULAR SUMMARY OF TYPOGRAPHY RECOMMENDATIONS
From Paterson and Tinker (47, p. 156)

<table>
<thead>
<tr>
<th>TYPOGRAPHICAL FACTORS</th>
<th>SATISFACTORY PRINTING ARRANGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Style of type face</td>
<td>Any commonly used modern or ultra-</td>
</tr>
<tr>
<td></td>
<td>modern type face</td>
</tr>
<tr>
<td>2. Type form</td>
<td>Caps and lower case. Bold face</td>
</tr>
<tr>
<td></td>
<td>for emphasis and for reading at</td>
</tr>
<tr>
<td></td>
<td>a distance. Italic for emphasis</td>
</tr>
<tr>
<td></td>
<td>only</td>
</tr>
<tr>
<td>3. Size of type</td>
<td>9, 10, 11, or 12 point ledged and</td>
</tr>
<tr>
<td></td>
<td>in optimal line widths</td>
</tr>
<tr>
<td>4. Width of line</td>
<td>Moderate line widths (in neighbor-</td>
</tr>
<tr>
<td></td>
<td>hood of 19 picas)</td>
</tr>
<tr>
<td>5. Leading in relation</td>
<td>6 point type. 2 point leading,</td>
</tr>
<tr>
<td>to type size and line</td>
<td>14 to 28 pica line width</td>
</tr>
<tr>
<td>width</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 point type. 2 point leading,</td>
</tr>
<tr>
<td></td>
<td>14 to 28 pica line width</td>
</tr>
<tr>
<td></td>
<td>11 point type. 2 point leading,</td>
</tr>
<tr>
<td></td>
<td>16 to 28 pica line width</td>
</tr>
<tr>
<td></td>
<td>12 point type. Set solid or</td>
</tr>
<tr>
<td></td>
<td>leaded 1 or 2 points in moderate</td>
</tr>
<tr>
<td></td>
<td>line widths (in neighborhood of</td>
</tr>
<tr>
<td></td>
<td>25 picas)</td>
</tr>
<tr>
<td>6. Margins</td>
<td>One quarter inch for top, outer,</td>
</tr>
<tr>
<td></td>
<td>and bottom margins; 3/4&quot; for in-</td>
</tr>
<tr>
<td></td>
<td>ner margin</td>
</tr>
<tr>
<td>7. Columnar arrangement</td>
<td>Single or double column</td>
</tr>
<tr>
<td>8. Space between columns</td>
<td>1/2 pica space with no rule</td>
</tr>
<tr>
<td>9. Color of print and background</td>
<td>Black print on white background,</td>
</tr>
<tr>
<td></td>
<td>or dark colored print on light</td>
</tr>
<tr>
<td></td>
<td>colored background</td>
</tr>
<tr>
<td>10. Paper surface</td>
<td>Dull finish, opaque paper stock</td>
</tr>
</tbody>
</table>
A flexible or spiral binding will not hold a book flat unless it is placed on a flat surface. A book with a stiff, cloth cover does not necessarily have to be placed on a flat surface.

The economy of paper covered books is emphasized by their protagonists. This is questionable when the fact is considered that cloth covered books are more durable and will stand longer wear. The economy of the issue is not the only consideration. The books are purchased for the educational value they have for the students, and the type of cover and binding contribute to this value. Coltharp (13, p. 45) believes:

The binding and cover of a textbook make a definite impression on the user. A cloth binding is obviously more serviceable than a paper one, and the length of service of a book is an item worthy of consideration.

These points indicate a cloth-bound book with a stiff cover would be a better selection than a paper covered book with flexible binding.

A paper covered manual may be discarded when it is outdated. However, it is not necessary to discard a higher priced cloth-bound book. Callahan (9, p. 369) relates what can be done:

When the contents of a book must be constantly brought up-to-date, as in an aircraft manual, it is still not necessary to discard an entire book and get a cheap reprint from another source. New methods of design and construction may be covered by pages to be inserted in a solidly bound loose-leaf textbook.
A cloth-bound book kept up-to-date by inserted pages would withstand greater wear and make a better impression on the user than a cheap, paper book.

The chart near the beginning of this section gives size of the book as one of the fifteen considerations used in the five other rating scales. Coltharp (13, p. 45) tells of some points to study in relation to the size of a textbook:

A large, heavy textbook will not have the convenience of a smaller one of the standard 6x9 inch size, hence will probably be less used. On the other hand, a book smaller than this is likely to limit the size and vividness of the illustrations, and so it is not recommended.

Inspection of three books that are profusely illustrated, Household Mechanics, Pewter, and Your Craft Book, shows eight and one-half by eleven inches to be a good size. These books are of a minimum thickness, so even though they are larger in size their weight is not excessive.

Value of Typography. This section has dealt with factors that make reading faster and easier. If these elements are applied to textbooks, Sachs (52, p. 2239) believes:

It will generally be admitted that there is a greater likelihood of subject matter being retained if it is enjoyed - i.e. in the emotional sense, and more particularly in the typography.

Typography in that light is an important item in a rating scale as it actually contributes to the value of a book from the standpoint of ease and speed of reading and retention of material by the reader.
ILLUSTRATIONS

The importance of illustrations may be judged by the popularity of newspapers and magazines that make extensive use of them. Because of this importance it is natural for textbooks to use illustrations to strengthen their attractiveness to students. This is stressed by Arthur Thompson (61, p. 33), the Chairman of the Textbook Clinic sponsored by Publisher's Weekly Magazine:

One of the outstanding virtues of present day textbooks, as compared to those of a generation ago, is in the number and quality of illustrations they contain. There isn't much doubt that textbooks should be generously illustrated, especially those for younger children.

Illustrations, when considered of such high importance to the value of a text, certainly should bear scrutiny in an inclusive rating scale.

Little Value Attached. The trend toward emphasis of illustrations is relatively recent as indicated by the slight mention of them in early rating scales. The following brief summary will bear out this statement:

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>Hall-Quest</td>
<td>Uses illustrations as a minor point</td>
</tr>
<tr>
<td></td>
<td>(27, p.84)</td>
<td></td>
</tr>
<tr>
<td>1921</td>
<td>Maxwell</td>
<td>Gives illustrations slight mention</td>
</tr>
<tr>
<td></td>
<td>(39, p.78)</td>
<td></td>
</tr>
<tr>
<td>1922</td>
<td>Franzen &amp; Knight</td>
<td>Consider the difficulty of illustrations under the heading Comprehension</td>
</tr>
<tr>
<td></td>
<td>(24, p.31)</td>
<td></td>
</tr>
<tr>
<td>1923</td>
<td>Fowlkes</td>
<td>Charts the Proportional Distribution of Illustrative Material. Evaluates reliability and validity</td>
</tr>
<tr>
<td></td>
<td>(23, p.29)</td>
<td></td>
</tr>
</tbody>
</table>
1925 Rader  
(49, p.302)  
Mentions illustrations as minor point

1931 Dawson  
(43, p.154)  
Makes no specific mention of illustrations

1945 Williams  
(73, p.346)  
3 factors of 20 pertain to quality of illustrations

This résumé shows that former rating scales surveyed here, with the exception of those by Powlkes and Williams, make no contribution to the objective evaluation of illustrations.

**Rating Illustrations.** Current literature contains reports of information that may be applied to the objective rating of illustrative material in textbooks. *A Manual of Style* from the University of Chicago Press (66, p. 6) presents one important consideration:

> Figures, tabular matter and text figures should be placed as near as practicable to the point of reference in the text.

This is adhered to whenever possible to save the reader the trouble of paging and hunting for an illustration. If it is too hard to find he will lose the continuity of thought before returning to his place in the text. Thompson (61, p. 34) gives this rule concerning the quality of illustrations:

> It can be said of course, that every illustration in every book should be clear, handsome, and precisely to the point.

This necessity for a high quality and usefulness is also emphasized by Bartlett (3, p. 1340), who says:
Illustration which is mere ornamentation is not a merit in a book; it is an evidence of craven pandering to an unhealthy taste.

Illustrations account for a very large proportion of the cost of a textbook. They should, therefore, constitute an equally large proportion of the value of a textbook.

The emphasis here is on the quality rather than only a large quantity. To be of good quality, they should be clear and to the point.

All textbooks being used today do not use illustrations to the greatest advantage possible, according to Thompson (63, p. 162). He feels:

...that our textbooks (and other books) are full of hopelessly small reproductions of inadequate photographs, badly arranged and poorly printed on shiny, unattractive paper. How much better it would be if publishers used fewer halftones, and gave each one the space and care it deserved.

A tendency to be avoided, then, is the crowding of pictures without due regard for their proper use or attention. Another consideration in their use is pointed out by MacDonald (38, p. 129):

Even the smallest detail must be investigated thoroughly and it is for this reason that days and often weeks are spent in pursuit of authenticity.

Illustrations, being an effective means of transmitting information, must be carefully planned and executed to convey authentic material. The dire result, if this is not done, is pointed out by Thompson (62, p. 1479), who believes that:
...what it says will not be changed; if the subject's impression is wrong, it will never be corrected.

A check on the illustrations to ascertain their authenticity is important for that reason.

A Manual of Style (66, p. 165) stipulates that illustrations should be numbered in a separate series and consecutively throughout the entire book. This has been the accepted practice to facilitate referring a reader to a specific illustration.

Factors Gained by Inspection. Several books recommended by Dr. Warner were examined in order to gain other factors to consider in objectively analysing illustrations. Table 3, page 44, brings out a characteristic used that may be applied to photographs; namely, the object or principle being illustrated stands out in contrast to the background. This brings a focus of attention on the item emphasized by the illustration.

A number of illustrations grouped together with little or no line of demarcation between them should relate to a central theme as indicated by Table 4, page 45. This allows the reader to concentrate on one thought without any other ideas brought in to distract him before he has established a principle.

Inspection of Your Craft Book, Household Mechanics, and Pewter will show that the illustrations are found throughout the entire book. At almost every place in the text where the book is opened an illustration will be found on one or
TABLE 3

Principle for Illustrations: In photographs the main object stands out in contrast with the background.

Pewter, Osburn and Wilber (Appendix B)

<table>
<thead>
<tr>
<th>Illustration Number</th>
<th>Surrounding Area</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>light gray</td>
<td>dark gray</td>
</tr>
<tr>
<td>25</td>
<td>light gray</td>
<td>black</td>
</tr>
<tr>
<td>49</td>
<td>light gray</td>
<td>medium gray with black outline</td>
</tr>
<tr>
<td>84</td>
<td>light gray</td>
<td>dark gray</td>
</tr>
<tr>
<td>127</td>
<td>gray tint</td>
<td>medium gray, black</td>
</tr>
<tr>
<td>151</td>
<td>very light</td>
<td>dark gray</td>
</tr>
<tr>
<td>181</td>
<td>light gray</td>
<td>dark gray with black outline</td>
</tr>
<tr>
<td>192</td>
<td>light gray</td>
<td>dark gray with black outline</td>
</tr>
<tr>
<td>241</td>
<td>medium gray</td>
<td>very dark gray</td>
</tr>
<tr>
<td>283</td>
<td>almost white</td>
<td>dark gray</td>
</tr>
</tbody>
</table>

Metalwork, Ludwig (Appendix B)

<table>
<thead>
<tr>
<th>Illustration Number</th>
<th>Surrounding Area</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>white</td>
<td>black</td>
</tr>
<tr>
<td>223</td>
<td>black</td>
<td>white</td>
</tr>
<tr>
<td>302</td>
<td>dark gray</td>
<td>light gray</td>
</tr>
<tr>
<td>507</td>
<td>dark gray</td>
<td>light gray</td>
</tr>
<tr>
<td>543</td>
<td>light and medium gray</td>
<td>black</td>
</tr>
<tr>
<td>614</td>
<td>white</td>
<td>black</td>
</tr>
<tr>
<td>704</td>
<td>dark gray</td>
<td>light gray</td>
</tr>
<tr>
<td>807</td>
<td>varied</td>
<td>light gray</td>
</tr>
<tr>
<td>1001</td>
<td>black</td>
<td>light gray</td>
</tr>
<tr>
<td>1120</td>
<td>white</td>
<td>gray</td>
</tr>
</tbody>
</table>
TABLE 4

Principle for Illustrations: Those grouped together all relate to one topic.

Pewter, Osburn and Wilbur (Appendix B)

<table>
<thead>
<tr>
<th>Page</th>
<th>Page(s)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3 objects</td>
<td>Types of &quot;Decorated Oriental Pewter&quot;</td>
</tr>
<tr>
<td>11</td>
<td>4 illustrations</td>
<td>Examples of &quot;Early American Touches&quot;</td>
</tr>
<tr>
<td>24</td>
<td>9 illustrations</td>
<td>Examples of &quot;Surface Decoration&quot;</td>
</tr>
<tr>
<td>31</td>
<td>5 illustrations</td>
<td>Steps in &quot;Fashioning the Holder&quot;</td>
</tr>
<tr>
<td>52</td>
<td>5 illustrations</td>
<td>&quot;Additional Projects&quot; for pewter casting</td>
</tr>
<tr>
<td>65</td>
<td>7 illustrations</td>
<td>Types of &quot;Equipment for Raising&quot;</td>
</tr>
<tr>
<td>89</td>
<td>13 illustrations</td>
<td>Pieces of &quot;Equipment for Casting&quot;</td>
</tr>
<tr>
<td>112</td>
<td>5 illustrations</td>
<td>Parts of &quot;Lathe Equipment for Spinning&quot;</td>
</tr>
<tr>
<td>124</td>
<td>3 illustrations</td>
<td>Steps in &quot;Turning a Bead&quot;</td>
</tr>
<tr>
<td>136</td>
<td>8 illustrations</td>
<td>Steps in &quot;Making a Segmented Chuck&quot;</td>
</tr>
</tbody>
</table>

Household Mechanics, Bedell and Gardner (Appendix B)

<table>
<thead>
<tr>
<th>Page</th>
<th>Page(s)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 illustrations</td>
<td>Methods of sawing lumber</td>
</tr>
<tr>
<td>27</td>
<td>4 illustrations</td>
<td>Steps in making a keytag</td>
</tr>
<tr>
<td>36</td>
<td>4 illustrations</td>
<td>Steps in making a tin scoop</td>
</tr>
<tr>
<td>53</td>
<td>3 illustrations</td>
<td>Steps in mixing paint</td>
</tr>
<tr>
<td>91</td>
<td>7 illustrations</td>
<td>Types of wire</td>
</tr>
<tr>
<td>118</td>
<td>4 illustrations</td>
<td>Electrical devices</td>
</tr>
<tr>
<td>137</td>
<td>4 illustrations</td>
<td>Deals with garden hose</td>
</tr>
<tr>
<td>168</td>
<td>3 illustrations</td>
<td>Frame windows</td>
</tr>
<tr>
<td>212</td>
<td>3 illustrations</td>
<td>Sharpening a knife</td>
</tr>
<tr>
<td>229</td>
<td>3 illustrations</td>
<td>Wood cutting power machines</td>
</tr>
</tbody>
</table>
both of the facing pages. The exception to this occurs on a few pages where a new chapter is introduced. This even distribution of illustrations tends to hold the reader's interest throughout the book.

Each illustration needs an explanation or name to tell the reader what is being shown. Household Mechanics, Metalwork, Pewter, and Your Craft Book each carry out this principle with meticulous care. Another condition carefully observed in each of these books is that each separate illustration gives one specific point without complicating evidence; for example, in Metalwork, Fig. 751 shows different types of nuts; Fig. 752 shows a lock nut assembled; Fig. 753 shows a flat and a lock washer; and 754 shows the bolt, nut, and washers assembled. One specific item is treated in each figure. If an assembly of all the parts had been used to describe the parts, as well as show their use, it might have been confusing to the reader. Another example may be found in Household Mechanics: Fig. 298 shows a screw plug; Fig. 299 shows a wall outlet; Fig. 300 shows a flat plug; Fig. 301 shows a round plug; and Fig. 302 shows a heavy duty plug. If all these types of plugs were shown in one illustration the reader might have been left with a confused impression.

An illustration having several sections or parts that may be new or different to the reader should have each part clearly labeled. Good examples of this principle may be found in the illustrations indicated in the following books:
Household Mechanics . . Figs. 91, 279, and 547
Metalwork . . . . . . Figs. 189, 739, and 204
Pewter . . . . . . . . . Figs. 82, 128, and 280
Your Craft Book . . . Figs. 16, 92, and 175

Parts of a diagram mentioned, but not clearly labeled, may leave the reader in a state of confusion.

Plates may show several steps of a process. These should appear in a logical order to make them easily understood by the reader. This technique will also make possible a minimum amount of explanations either in the notes or in the text.

The illustrations of Pewter and Household Mechanics were analysed individually in order to classify the types used. Inspection of Table 5, p. 48 will show each illustration can be placed under one of these heads:

- Suggestions for projects
- Clarification of processes
- Description of tools and machines
- Other types

Problem of Illustrating. Dalgliesh (17, p. 21) states that each book is a special illustrating problem and should be handled as such. Inasmuch as the text of each book will convey different information, the illustrations also will need to cope with different material. However, the items mentioned in this chapter are ones that may be applied to estimate or evaluate the general characteristics of all illustrations.
TABLE 5

Principle for Illustrations: Four types of illustrations: Suggestions for Projects, Clarification of Processes, Description of Tools and Machines, Other Types.

**Pewter, Osburn and Wilber**

54 Photographs
- 21 illustrating examples of items mentioned in text
- 28 giving ideas for various projects
- 3 illustrating a method
- 1 showing a physical setting
- 1 frontispiece

262 Sketches and Drawings
- 117 showing methods or processes
- 79 suggesting projects
- 66 classifying tools

**Household Mechanics, Bedell and Gardner**

665 Sketches and Drawings
- 265 showing methods or processes
- 170 classifying tools
- 158 illustrating examples of items mentioned in text
- 49 suggesting projects
READABILITY

The problem of readability, or ease of reading, has long been recognized as a factor in textbook evaluation. However, in the older rating scales this phase was usually treated in a very general manner.

**Early Rating Scales.** Hall-Quest (27, p. 83) in 1920 used several adjectives to qualify the style of writing:

Style: clear, graphic, colorful, dramatic, virile, dynamic, intimate, attractive, wholesomely technical.

Each adjective was presented in the form of a direct topic, but the evaluation of the topics was still a very subjective method. Even so it was a much more thorough treatment than C. R. Maxwell (39, p. 81) gave it in 1921. He had just two questions: one on vocabulary, and one in the style of writing.

Five major criteria for rating textbooks were given by Franzen and Knight (24, p. 11) in 1922. The second one dealt with comprehension, under which these three items were listed:

The factor of comprehension
1. reading difficulty
2. difficulty of concepts
3. difficulty of illustrations

Further information to define these difficulties was not given, so in rating a book there was no scale or plan to make the evaluation more objective.

Fowlkes (23, p. 16) in 1923 had a section of his lengthy rating scale devoted to Style and Nature. About twenty questions covered such topics as diction and the
type of appeal. This appeared to be a more thorough and effective treatment.

Thorndike published his list of 10,000 most common words about this time. These were used by Bertha Lively (36) in her master's thesis study published in 1923. She used Thorndike's list of words to evaluate the difficulty of the vocabularies of textbooks.

**Scientific Studies.** There followed a period of scientific research in this field of readability.* It wasn't until 1935, however, that Gray and Leary (25, p. 230) published the results of their work in which they carefully defined the limitations of the problem by stating:

Selecting a readable book, like defining a readable book, is a highly individual problem. It depends first, upon the reader's interests, needs and abilities; and, second, upon the qualities of a book that make it readable for him.

The findings of Gray and Leary must be accepted with some reservation. They dealt with readability as a problem confronting adults selecting books from a public library.

Selecting textbooks for a class in school differs in this respect: the reading ability of students at a given grade in school will be more homogeneous than that of a group of adults from a public library. Even so, there may be students with reading ability above and below that grade level as Dale and Hager (16, p. 47) indicate:

---

*Mrs. Jeanne Chall (9) in her article, "This Business of Readability", includes a historical study of work in this field.
For example, in a fourth-grade class you might find abilities varying from second to sixth grade; or in a tenth-grade class there might be reading abilities varying from seventh grade to college level.

The reader's interests and needs may vary just as reading abilities do. The problem remains of picking out books for these groups at given grade levels. A logical solution might be to deal with the average of the group in the grade level they are studying, and allow the teacher to help the individuals whose abilities vary a marked degree from the average.

Use of Formulas. The second factor, listed by Gray and Leary in the quotation on the previous page, is one that can be treated by objective analysis. The qualities of a printed book should not vary. They can be evaluated and a rating placed on the book. That is just what Gray and Leary worked toward. These two men asked librarians, publishers, and people interested in adult education to rate four factors in order of importance and these were the results:

First: Content  
Second: Style of expression and presentation  
Third: General features of organization  
Fourth: Format

Note that the factor they rated of second importance, style of expression and presentation is the one under consideration here. In order to study this factor objectively, Gray and Leary tested 756 adults between the ages of fifteen and fifty. The results showed eight elements that, to these two men (25, p. 130), seemed to meet the requirements set up for selection:
They are: number of different hard words; number of easy words; percentage of monosyllables; number of first-, second-, and third person pronouns; average sentence length in words; percentage of different words; number of prepositional phrases; and number of simple sentences.

Using all of these factors they carefully analysed the reading passages used to test the 756 adults. Each factor was carefully considered and its effect given a numerical weight. As a result, Gray and Leary (25, p. 249) were able to predict difficulty in terms of an average reading score by using this formula:

\[ x_1 = 0.06566x_2 - 0.001286x_3 - 0.004064x_4 - 0.007545x_5 - 0.02342x_6 - 0.03371x_7 - 0.01455x_8 - 0.01015x_9 - 3.408 + 2.941 \]

The algebraic expressions are computations of the factors in the quotation above. Each has a constant to give it the proper weight in order to arrive at a grade level. Regarding the use of the formula they (25, p. 253) say:

Since the time required to predict the difficulty of a single book may reach several hours, every effort should be made not to duplicate computations... Doubtless the most economical service can be obtained through a central agency.

No evidence of such an agency has been found, so the practicability of using such a formula for a rating technique for textbooks is questionable, especially in view of the fact that more workable formulas have been published.

Dr. Rudolph Flesch of the Teacher's College, Columbia University, published a formula in 1943 that is apparently used widely today. It is much easier to work with than those published previously. Flesch (22, p. 37) found that:
Simple, easily understandable English, as has been shown, can be achieved by using short sentences, few affixed morphemes, and many references to people.

He uses these three factors as the basis of his formula, but emphasizes that appeal of subject matter and brevity are also to be considered. The Flesch Formula with a brief explanation of its parts are given on the following page (table 6).

Compared with Gray and Leary's Formula, Flesch's Formula is much easier to work with. However, it does take rather extensive study to be able to recognize affixes. For that reason this formula is not used for this study.

**The Dale Formula.** Dr. Edgar E. Dale, head of the Curriculum Division in the Bureau of Educational Research at The Ohio State University, is carrying on an extensive study of readability. The key to his approach is given in this quotation (16, p. 20):

> Numerous studies on readability have shown that the vocabulary difficulty of a publication plays a large part in determining the general difficulty of the publication.

Dr. Dale, in order to work with vocabulary difficulty, has compiled a list of about 2800 words which are easy or common. He also worked out a formula to use with this list to establish a level of difficulty or grade level for reading matter. This Dale Formula is still in an experimental form and its use is restricted. It is used here with special permission and under the personal direction of Dr. Dale.
**TABLE 6**

**FLESCH READABILITY FORMULA (22, p.38)**

How to use the formula:

1. Select about one-tenth of the words in the book (one-hundred word samples from every tenth page).

2. Count all words or items separated by white space.

3. For \( X_s \) count the number of sentences in each one-hundred word sample (semi-colons may be sentences if they indicate a complete thought).

4. For \( X_m \) count affixes (inflectional endings, prefixes, suffixes, foreign endings. Do not count plural endings).

5. For \( X_h \) count the number of personal references.

6. Compute the average from all one-hundred word samples.

7. Use the formula:

   \[
   0.1338X_s - 0.0645X_m - 0.0659X_h = 4.2498
   \]

8. The result is a reading grade placement.

*For complete directions see reference.*
The Dale Formula, as mentioned above, is built around the use of the Dale Word List. To evaluate a book, a one-hundred word passage is taken from every tenth page. Each passage is checked for the number of words not on the Dale Word List, the number of sentences, and the total number of words. Using this data the Dale Formula is worked to establish a grade level for each passage and an average grade level for the whole book. Three books were evaluated using this formula, to experiment with the application of it. Appendix A shows the passages used from each of the three books and the grade level established for each passage and for the books.

**Graded Samples.** There is another method of predicting reading difficulty. It is not as objective as the use of a formula, but it is proposed for this study because it can set up an approximate reading level in a minimum amount of time. Gray and Leary (25, p. 278) proposed its use:

> Another method of predicting difficulty in reading is to compare a sample of the book with a set of four graded, standard paragraphs.

The authors recommended taking about ten paragraphs from a book and comparing them with the samples.

Dale and Hager (16, p. 42) use a series of graded paragraphs in their book, *How to Write and Be Understood*. They explain the use of these paragraphs by saying:

> The purpose of these selections is to serve as a guide for authors who wish to write at specific reading levels.
The purpose here is similar to the purpose graded paragraphs may have in a textbook rating technique: to serve as a guide for teachers in selecting books for different levels of the industrial arts program. Chapter III has indicated that industrial arts programs are planned for four grade levels: adults, 13th to 16th, 9th to 12th, and 6th to 8th grades. The logical tendency would be for the reading materials to be graded in a similar manner.

Preparing Graded Samples. The first paragraph of Wilber and Osburn's book, *Pewter*, (Appendix B) is for the 13th to 15th grades according to the Dale Formula, so it was used for the sample of reading on the college level. It may be found on page 57 (table 7) with two other samples of reading for 13th to 15th grades.

The next problem was to have a sample indicate the reading level for the 9th to 12th grades. In order to provide a better comparison, the sample from Wilber and Osburn's book was carefully rewritten and tested with the Dale Formula. It indicated a sample of reading on the 9th to 12th grade level as was desired. It is on page 58 (table 8) with two other samples of paragraphs written on the 9th to 12th grade level.

The rewriting of this sample paragraph was not merely an attempt to pick out easier words. An attempt was made to reorganize the structure and style to convey the same thoughts in a manner easier to understand. One factor con-
TABLE 7

THREE SAMPLES OF READING ON THE 13th to 15th GRADE LEVEL:

Pewter, Osburn and Wilber (Appendix B)

The "Story of Pewter" is a narrative of service to mankind. Pewter has played an important part in the development of civilization, both as a medium for artistic expression and as a material from which domestic utensils were fashioned. The bronze used by the ancients was composed of a large percentage of copper and a smaller amount of tin. Now the complement of this alloy, that is, a large proportion of tin with a small amount of copper, gives an excellent form of pewter. Whether the reversal of the proportions of these two metals came first as an accidental mismeasurement of the two ores, or whether it was due to experimentation, whether aimless or purposeful, has not been determined.

Welding and Its Application, Rossi (Appendix B)

The manipulation of the welding arc may be properly learned by anyone having average intelligence and a steady hand. Previous mechanical training will help the prospective operator to become proficient but is not essential. A full understanding of the requirements of the welding arc will prove an invaluable aid.

In the manual metallic-arc-welding process, it is desirable to grip the electrode at the end remote from the arc terminal so that the entire length can be deposited without breaking the arc. But sometimes, to avoid overheating, very small electrodes and coated electrodes of extra length are provided with an exposed section in the center for the electric-holder grip.

Forging Practice, Johnson (Appendix B)

Lack of chemical homogeneity in steel is largely due to segregation occurring during the solidification of steel in the ingot mold. When cast ingot steel solidifies, the outer surface in contact with the surface of the mold becomes solid first, and because selective freezing takes place when alloys similar to steel solidify, the uniformity of composition of the liquid steel is destroyed. The first portion of the ingot to freeze is apt to be low in carbon, phosphorus, and other elements, as well as non-metallic inclusions; the last portion to freeze is apt to be rich in these constituents.
TABLE 8

THREE SAMPLES OF READING ON THE 9th to 12th GRADE LEVEL:

Rewritten from Pewter, Osburn and Wilber (Appendix B)

The "Story of Pewter" is a narrative of service to man-kind. Pewter has played an important part in the development of civilization for two reasons. First, it has been a metal that artists could easily shape into pleasing forms. Second, it was used to make many useful domestic utensils.

When bronze was first used, a long time ago, it was made of a large percentage of copper and a smaller amount of tin. An excellent form of pewter consists of the same two metals, but in a different proportion. It has a larger amount of tin and less copper.

It has not been determined how the proportions of the two metals used for bronze became reversed to produce pewter. It may have been the outcome of either careful or aimless experimentation.

Pewter, Osburn and Wilber (Appendix B)

The candle socket may be made by the same process that was used for the ink bottle holder. The tray may be beaten down in a mold similar to that used for the porringer.

Fourteen-gauge pewter should be used for the bracket. This metal is shaped over a wooden stake and planished to give stiffness. Solder the parts and clean as previously described.

Ornamental Inset. A device for adding interest to some spot or appendage is that of setting in a decorative piece of copper or other metal, a stone, plastic, or ceramic ornament.

Household Mechanics, Bedell and Gardner (Appendix B)

The electric circuit has been discussed earlier in this chapter. In Fig. 239 it was shown how electric current passes from the source, through the appliance, and back to the source, making a complete circuit. Electric circuits in a house are the same except that the generators at the local power company are the source instead of the dry cell. In our discussion of the house circuit, we will refer to the service switch as the source of electricity, since the power company ends its responsibility at that point.

When a house is wired for electricity, the power company runs its wires to the house, through a meter, and then to a service switch.
sidered in this rewriting is given by Dale and Hager (16, p. 10) as:

A simple and easy flow of related ideas, with good transitions, is absolutely essential to easy reading. Each part of an article, or book, or a pamphlet must follow logically from each preceding part.

Even within a short article such as this sample, it was possible to improve the transition between the different ideas. These ideas are easier to convey if less complex sentences are used. Dale and Hager (16, p. 16) state:

Analysis has shown that long sentences made complex by dependent clauses and prepositional phrases add to reading difficulty.

The effect of shorter sentences is evident when the samples are compared. Very similar in effect is the use of shorter paragraphs. Dale and Hager (16, p. 17) write that:

...each paragraph should be a single unit, complete in its development of an aspect of what is being communicated.

The sample for the 9th to 12th grade level was broken into three paragraphs where only one was used on the 13th to 15th grade level.

The sample paragraph was again rewritten to illustrate writing on the 6th to 8th grade level. It is at the top of page 60 (table 9) with two other samples of writing for that level.

The factors of easier words, good transitions, shorter sentences, and shorter paragraphs were again considered in preparing this sample. A new factor given greater emphasis
TABLE 9

THREE SAMPLES OF READING ON THE 6th to 8th GRADE LEVEL:

Rewritten from Pewter, Osburn and Wilber (Appendix B)

Pewter is a metal used in our everyday life. For a long, long time it has been used to make pots and pans for our homes. It also has other uses. For example, artists make very beautiful vases from this shiny, white metal.

Do you know that pewter is made of two very common metals? They are tin and copper, which are melted together. The best pewter has quite a bit of tin and just a little copper.

If you are not careful when you measure the tin and copper, you will not be able to make pewter. Too much copper in the mixture will cause it to be a different metal. This would be called bronze.

Bronze has been used much longer than pewter. Perhaps somebody, trying to make bronze, made a mistake in measuring and got pewter.

No one is certain if that is what happened. Maybe someone tried using different amounts of tin and copper. When they used a lot of tin and just a little copper, they found it made a good metal to work with, and they called it pewter.

Your Craft Book, Newkirk and Zutter (Appendix B)

A toy or a game is fun either in the home or out of doors, for warm or cold weather, for sunshine or rain, and for both girls and boys. All the toys illustrated can be made of most simple materials that are easy to obtain and fun to work with.

Perhaps you wish to make a little gift for your brother, sister, or friend; it might well be a birthday or a Christmas gift. You may be wanting something to donate for a sale to raise funds; your club or class may be filling Christmas boxes or baskets. There are several suitable toys and games you can find in this chapter to answer these needs.

Household Mechanics, Bedell and Gardner (Appendix B)

Most people enjoy a picnic where they can toast wiener and marshmallows, but sometimes sticks to toast them on are rather scarce, and even then, sticks are clumsy. A simple home made toasting fork, made from wire, is much better. They are simply and easily made.

The only material necessary is a piece of No. 10 wire, about twice the length of the fork desired. If the fork is to be longer than about 30", a heavier wire should be used. The tools you will need are a pair of pliers, wire cutters, and a stick with which to twist the wire.
for this level was that of making the approach more personal. Dale and Hager (16, p. 26) explain it by saying:

Address the reader directly, as if you were talking to him informally. Use anecdotes. Use the tone of a personal letter rather than that of a technical paper.

Notice that the sample for the 6th and 8th grades uses this personal approach.

**Adult Reading Level.** There is a question as to what reading level to recommend for adults. Gray and Leary (25, p. 13) tell us:

Measurement of the reading ability of 1,690 adults showed a wide variation in achievement, ranging from a grade equivalent below 2.95 to one above 16.95.

They also found that one-sixth of the adults were at the level of high school graduates and one-sixth were at the lower elementary grades. This data would indicate that it would be necessary to make a survey of the class of adults to determine what reading level the class may have. Statistics given by Dale and Hager (16, p. 1) should be of assistance in this matter:

...about 40,000,000 of the 90,000,000 adult Americans have had eighth-grade education or less. Wide study has shown that an adult's reading level is about one grade lower than the last school grade he reached.

The teacher could easily estimate the reading level of the class by using this general rule after finding the last grade each class member attended in school. If a more accurate measurement of the reading level of any class is
desired there are several reading tests, whose validity has been established.

An author may want to write at the level necessary to reach a group of adults of unknown reading ability. In this case the Bureau of Census Reports, Volume II Characteristics of the Population (1940 Population) may be of some help. It gives the percentage of people reaching the different school grades. This information is classified by area and by classes of people. Thus an author may be able to find the last school grade attended by the group of people for whom he is writing.

Using Technical Words. The question of the use of technical words or phrases is a difficult one to answer. A great many technical terms would raise the reading level above the comprehension of the average student, especially when industrial arts is considered a subject in general education. On the other hand, some technical words should be included to give the student a good picture of industrial activity. T. H. Briggs (7, p. 531) gives seemingly sound advice on this matter:

Although authors should make an effort to keep the vocabulary simple, the introduction of technical and other new words and phrases is not only inevitable but also desirable. At their first use, they should be explained and the meaning made clear by context.

This appears to be good practice, but trying to adhere to it may prove to be a difficult matter.

Additions to Word List. The Dale Word List may need to be supplemented when used to rate advanced reading in a
technical field. The list as originally prepared includes all the words that are easy for the general public. After a person has done an appreciable amount of work in a technical field, he becomes thoroughly acquainted with terms or names that formerly were difficult words to him. In that case a supplement to the Dale Word List may be prepared. It would include words that are easy for advanced work in a certain specific field.

The first paragraph from Osburn and Wilber's book, Pewter, illustrates this point. Such words as bronze, pewter, and alloy are hard words according to the Dale Word List. However, it is possible that a person who has worked with these metals would find these three terms relatively easy. Therefore, the words bronze, pewter, and alloy, might be listed to supplement the Dale Word List when used to rate words for advanced readers in metal work.

Dale and Hager (16) made a study to find out easy words for pupils learning about tuberculosis. They gave several school classes specially prepared reading tests to discover which words concerning tuberculosis were easy and which were hard. The result was a list of words that might be considered easy for a group of children studying tuberculosis.

Re-writing Material. Dr. Dale advises that care must be exercised in using the formula to rewrite material. The formula uses two mechanical features to predict reading difficulty: hard words and sentence length. It is possible to rewrite a paragraph (by substituting easy words for hard ones)
so the formula test would indicate it is easier to read. Actually it only has easier words. Unless such factors as transitions, complicated sentence structure, or personalized approach are made easier, the formula will give a false indication of the reading level.

*Readability Emphasized.* This report on readability reflects some scientific investigations that are now being carried out on the subject. There seems to be a definite tendency to establish a grade level for all reading material. However, extreme caution is emphasized in the use of these factors to the exclusion of such considerations as individual differences, which includes such items as interest and motivation. The new information being worked out has significant implications for publishers, authors, and the teaching profession. Some of these will be indicated in Chapter VII.

**FACTORS NOT USED**

The study of rating scales used in the past revealed that several items were impractical to use, while others were considered by eminent educators to be of little value. Examples of each of these are given in this section.

*Impractical Standards.* Some standards set up in other rating scales are impractical to work with. To illustrate this point here is a statement on typography by Siders (55, p. 398):

> Standards for Adults: thickness of vertical stroke, 0.3mm.; spaces between letters 0.3 to 0.5mm; distance between lines, 2.5 mm. as a rule...
The form of these recommendations is very poor; for example, the thickness of the vertical stroke of letters is listed as 0.3 mm. This is only twelve thousandths of an inch, or less than one sixty-fourth of an inch. It would be exceedingly difficult to measure this to any degree of accuracy. The spaces between letters is expressed in an equally fine measurement. It is conceivable that a person designing type might work with these precision measurements, but certainly not an industrial arts teacher rating a textbook.

**Questionable Values.** Undue emphasis has been placed on certain factors used in the past. Maxwell (39, p. 23) says:

...we have seen that the selection should not be based on the prestige of the author or publisher, the sauvity of the salesman, the general appearance of the book, its wide use, or its low cost. These are factors which should be considered merely as minor elements for consideration.

J. B. Edmonson (43, p. 143), in reporting the findings of his committee to the National Society for the Study of Education, states that these factors as listed above by Maxwell should be accepted with reservations, if at all. In giving the reasons for being cautious about their use, Edmonson presents these arguments concerning the points listed:

1. **Prestige of Author.** A scholarly reputation does not make a man an author. He may have experiences to write about, but not be able to put them into presentable form. Conversely, a man without practical experience may be able
to draw together facts and experiences of others and write them in a very acceptable form.

2. Prestige of the Publisher. At times this was used to disparage books of other houses.

3. General Appearance. This is only one small factor among other qualities that should have more weight.

4. Wide Use. Advertising plays up this factor to sell the book. It may be an indication that a book may be good, but certainly not objective proof that would outweigh all other factors.

These examples are illustrative of other factors that were not included. More space and attention is not devoted to listing them in favor of the more positive approach of justifying the use of worthwhile material.

Factors Listed. The factors for developing a rating technique surveyed in this chapter were: general information, content and organization, adaptability, typography, illustrations, readability, and a few that were not used for the rating scale. Under each factor the treatment given it by other rating scales was surveyed. The supplementary information gathered from other studies was added, wherever it made a significant contribution.

The next chapter will undertake the task of drawing all of this together in a form that may be used to rate books.
Chapter V
A RATING TECHNIQUE

The results of research are valuable only to the scholar performing the work unless the resulting data are compiled in a form that can be easily interpreted and adapted to practical needs. Chapter IV has presented a wealth of material regarding the evaluation of textbooks for industrial arts. Such a compilation has insignificant value, however, unless it can be presented in a form that industrial arts teachers can use to rate textbooks. That is the purpose of this chapter.

DEVELOPMENT OF A TENTATIVE RATING TECHNIQUE

Objective Evidence. Subjective judgment seemed to be predominant in the early rating scales. This may be a valid method for a committee of experts to use in rating a book; however, an industrial arts teacher is not likely to have the experience and knowledge necessary to make an accurate estimate using only subjective judgment. An alternative to this method is proposed by Coverly (14, p. 270), who believes:

...questions should be such as will give prominence to the facts about the books judged rather than to the individual critic's opinion about the book.

The recommendation here is for questions that will produce a more objective method and thereby increase the value of the teacher's judgment. Coverly (14, p. 269) gives some other factors that enhance the worth of the objective method:

67
To reduce, and if possible, remove, the elements of guess, friendship, and prejudice in the selection of textbooks, we are trying to find some means that will lessen the subjective and increase the objective.

The true value of the book cannot be ascertained if such factors as guess, friendship, and prejudice predominate in the evaluation. Coverly is not the sole advocate of objective evidence. Franzen & Knight (24, p. 64) say:

Objective evidence should give preference over subjective opinion wherever possible.

The latter part of the statement would indicate it may not be possible to construct a rating technique that would rely entirely on objective judgment.

**A Tentative Form.** The data from Chapter IV were assembled in a manner that followed the outline used in that chapter. The six main divisions were:

I. General Information

II. Content and Organization

III. Adaptability

IV. Typography

V. Illustrations

VI. Readability

These topics were treated in an objective manner whenever it was possible. An attempt was made to eliminate all but the essential items, in order to assign a true value to a textbook in a minimum amount of time. The questions were worded to lead directly to the search for specific
evidence that would establish the true value of the textbook being rated.

Careful organization and many editings to improve the form, produced the following rating technique:

SELECTION OF TEXTBOOKS FOR INDUSTRIAL ARTS

To the Industrial Arts Teacher, Supervisor, or Critic: The following items are designed to assist you in the selection of suitable textbooks.

I. General Information
A. Title
B. Author
C. Publisher Address
D. Date of Publication Edition Price
E. Grade level for which book is to be used

II. Content and Organization
A. Author's purpose as stated in Preface

B. Survey of Table of Contents to determine topics treated.

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Pages</th>
<th>% of Book</th>
<th>Topic</th>
<th>No. of Pages</th>
<th>% of Book</th>
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</table>

C. Are the above topics given thorough treatment in the text?

D. Indicate which of the following helps for using the text are present:
Table of Contents .................. Good Fair Poor
Lists of Illustrations .......... Good Fair Poor
Paragraph Headings .............. Good Fair Poor
Suggestions for Projects ........ Good Fair Poor
Summaries ......................... Good Fair Poor
Appendices ....................... Good Fair Poor
Bibliography ..................... Good Fair Poor
Indexes .......................... Good Fair Poor

E. Is the book free from bias or dogmatism?

F. Is the material up-to-date?

G. Are there any errors in fact or principle?

H. Does it appeal to boys and girls?

III. Adaptability

A. Does the material of this book supplement work presented in other subjects of this school?

B. Does the material of this book supplement work presented in other phases of the shop?

C. To what advantage can this book be used in the laboratory?

D. Does it fulfill the purpose stated in the Preface?

IV. Typography. The following factors define typography for an ideal textbook. Naturally, all books will vary somewhat, but should conform to many of these specifications:
### V. Illustrations

The following are characteristics of ideal illustrations. Check the illustrations to see how nearly they conform to the ideals.

<table>
<thead>
<tr>
<th>Conforms</th>
<th>Exactly-Nearly-Very Little</th>
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</thead>
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<tr>
<td>A. Placed as near to point of reference as practical</td>
<td>__________________________</td>
</tr>
<tr>
<td>B. Clear and precisely to the point.</td>
<td>__________________________</td>
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<tr>
<td>C. Not crowded.</td>
<td>__________________________</td>
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<tr>
<td>D. Authentic.</td>
<td>__________________________</td>
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<tr>
<td>E. Numbered consecutively throughout the book.</td>
<td>__________________________</td>
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</tbody>
</table>
F. In photographs the main object stands out in contrast with background

G. Those grouped together all relate to one theme.

H. Spaced throughout the book . . . . . . .

I. Explanatory note, or a reference in text. . .

J. One specific point without complicating evidence

K. Parts of diagrams clearly labeled. . . .

L. Logical order of steps for processes. . . .

M. Number of each of the following types of illustrations:
   Suggestions for projects
   Clarification of processes
   Description of tools and machines
   Other types

VI. Readability or Reading Difficulty

A. Is there a simple flow of related ideas with good transitions?

B. Is the material presented in small units that can be easily grasped?

C. Can the reader see an application of the material presented?

D. Dr. Edgar E. Dale of the Bureau of Educational Research devised a formula for establishing the reading level of text materials. The following paragraphs have been prepared by using this formula. Additional information concerning the use will be supplied before the formula is released. Do you feel that the grade levels shown are correct?
13th to 16th Grades (Quoted from Osburn and Wilber, Pewter)

"The 'Story of Pewter' is a narrative of service to mankind. Pewter has played an important part in the development of civilization, both as a medium for artistic expression and as a material from which domestic utensils were fashioned. The bronze used by the ancients was composed of a large percentage of copper and a smaller amount of tin. Now the complement of this alloy, that is, a large proportion of tin with a small amount of copper, gives an excellent form of pewter. Whether the reversal of the proportions of these two metals came first as an accidental mismeasurement of the two ores, or whether it was due to experimentation, whether aimless or purposeful, has not been determined."

9th to 12th Grades and ADULTS (Revised from Osburn and Wilber)

The "Story of Pewter" is a narrative of service to mankind. Pewter has played an important part in the development of civilization for two reasons. First, it has been a metal that artists could easily shape into pleasing forms. Second, it was used to make many useful domestic utensils. When bronze was first used, a long time ago, it was made of a large percentage of copper and a smaller amount of tin. An excellent form of pewter consists of the same two metals, but in a different proportion. It has a larger amount of tin and less copper.

It has not been determined how the proportions of the two metals used for bronze became reversed to produce pewter. It may have been due to an accident in measuring the ingredients. Then, too, it may have been the outcome of either careful or aimless experimentation.

6th to 8th Grades (Revised from Osburn and Wilber)

Pewter is a metal used in our everyday life. For a long, long time it has been used to make pots and pans for our homes. It also has other uses. For example, artists make very beautiful vases from this shiny, white metal.

Do you know that pewter is made of two very common metals? They are tin and copper, which are melted together. The best pewter has quite a bit of tin and just a little copper.

If you are not careful when you measure the tin and copper you will not be able to make pewter. Too much copper in the mixture will cause it to be a different metal. This would be called bronze.

Bronze has been used much longer than pewter. Perhaps somebody, trying to make bronze, made a mistake in measuring, and got pewter.

No one is certain if that is what happened. Maybe someone tried using different amounts of tin and copper. When they used a lot of tin and just a little copper, they found it made a good metal to work with, and they called it pewter.
APPLICATION OF THE RATING TECHNIQUE TO ELEVEN TEXTBOOKS

The tentative rating technique was designed to determine the value of textbooks for industrial arts. To test the practicality of this tentative form, eleven textbooks were inspected through its use. The books were selected from the Industrial Arts Laboratory Library at The Ohio State University. The following criteria governed the selection of the textbooks:

1. One book from each publishing house producing material for industrial arts.
2. Books published during the last ten years.
3. Books giving different types of information (technical data, craftwork, instruction for use of tools and machines, related information).
4. Books that might be used in an industrial arts laboratory, but not necessarily for teacher education.

Textbooks Inspected. The eleven books selected were:* 

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
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<tr>
<td>Baudek &amp; Whipple</td>
<td>Engine Lathe Operation</td>
<td>McKnight &amp; McKnight</td>
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<tr>
<td>Cox &amp; Weisman</td>
<td>Creative Hands</td>
<td>John Wiley &amp; Sons</td>
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<tr>
<td>Johnson</td>
<td>Forging Practice</td>
<td>Am. Technical Society</td>
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<tr>
<td>Johnson &amp; Newkirk</td>
<td>Fundamentals of Electricity</td>
<td>MacMillan</td>
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*Complete bibliographical information on each of these books is given in Appendix B.
The use of the tentative rating scale provided an objective means of inspecting these books. No attempt was made to establish a comparative value for this heterogeneous group of books. The object was to find any weak points and discover ways to improve the rating technique. Table 10, which follows, summarizes the difficulties encountered. They will be considered in the revision of the rating technique in Chapter VI.

REATIONS OF SELECTED JURY

Chapter II indicated the need for having a rating technique evaluated by a group of publishers' representatives, educational leaders, and experienced teachers. To meet this necessity, mimeographed copies of the tentative rating scale were prepared. The cover letter, written as an introduction and a directive for recording reactions, may be found in Appendix C.
TABLE 10
DIFFICULTIES ENCOUNTERED IN APPLICATION OF RATING TECHNIQUE TO ELEVEN BOOKS

Only the items of the rating technique that were found to need improvement are listed below. The comment that follows each item explains the difficulty encountered.

I. General Information

A. Title ____________________________________________

B. Author __________________________________________

  Books are usually listed by the name of the author; therefore, it would be more convenient to interchange A and B to place the author's name at the top and the title of the book second.

C. Publisher ___________ Address _____________

  The spaces are not long enough to write in the information requested. A full line should be allowed for the publisher's name and another line for the publisher's address.

  The number of the pages in the book is given in proper bibliographical data and should be included in the rating technique.

II. Content and Organization

A. Author's purpose as stated in Preface __________________________________________

  This space allotment was not enough for the books by Cox and Weisman, Johnson and Newkirk, and Rossi. For several other books this was just enough space. It was necessary to write small as the lines are close together for handwriting.

B. Survey of Table of Contents to determine topics treated.

<table>
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<tr>
<th>Topic</th>
<th>No. of Pages</th>
<th>% of Book</th>
<th>Topic</th>
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<td>Book</td>
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TABLE 10 (Continued)

The column headed "% of book" is of questionable value. The number of pages can be used to compare the amounts of space devoted to the various topics. When two books of different lengths are compared, it is necessary to check the number of pages devoted to comparable topics rather than the per cent of the book.

There was not a sufficient number of spaces to list all of the topics covered by Johnson and Newkirk, Karch, Morgan, and Rossi in their books.

C. Are the above topics given thorough treatment in the text?

The question is too general to lead to a thorough investigation of each topic. The tendency is to answer it by generalizing about the whole book instead of reporting the treatment of each topic.

D. Indicate which of the following helps for using the text are present:

<table>
<thead>
<tr>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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Every book with the exception of the ones written by Johnson and Newkirk, Karch, Rossi, and Williams, had at least two of the helps missing entirely. This would indicate the necessity of changing the column heads or adding another column.

List of Illustrations . . .

Morgan was the only author to use a list of illustrations. Inasmuch as the eleven books had an average of 180 illustrations per book, it is obvious that this large number would take an excessive amount of space to list.

Suggestions for Projects . .

Chapter III has shown that the program for industrial arts includes many types of activities other than the making of projects. The substitution of the word 'activities' for the word 'projects' may help to convey the broader concept.

E. Is the book free from bias or dogmatism?

F. Is the material up-to-date?

G. Are there any errors in fact or principle?
TABLE 10 (Continued)

H. Does it appeal to boys and girls? 

These four questions are general and subjective. Perhaps rewording or further explanation would help clarify the ideas presented. Also, it would be more convenient to place them directly after the survey of the contents.

III. Adaptability

The person using this rating technique would be in a better position to answer these questions after the typography, illustrations, and readability have been inspected and evaluated.

C. To what advantage can this book be used in the laboratory?

The answer to this question is one of the key indications to the value of the book for the purpose it will be used. For this reason it should be given more space and more emphasis.

V. Illustrations

M. Number of each of the following types of illustrations:

   Suggestions for projects
   Clarification of processes
   Description of tools and machines
   Other types

The division of illustrations into "Clarification of processes", "Description of tools and machines", and "Other types" is of questionable value. The variation of these factors in the eleven books studied was due to the type of book and the method used to present the information. However, the total number of illustrations may be used to determine the extent to which the book is illustrated. Chapter III shows the need for many types of activities in a strong industrial arts program. The pupils may find ideas and motivation for activities from the illustrations in books.
Publishers. Four publishers' representatives were selected from the publishing houses that contribute a great number of books that are used for industrial arts, namely:

The Bruce Publishing Company
D. C. Heath & Company
International Textbook Company
McKnight & McKnight

Leaders. The educational leaders of industrial arts were selected with the assistance of Dr. Warner, the thesis adviser. The group of twenty-two leaders are from fourteen different states in the United States. The geographical areas from Massachusetts to California, and from Oregon to Florida are included. Only one outstanding man was selected from each geographic locality. Comprising the group are: four city directors of industrial arts programs, thirteen directors of teacher education programs, and five professors who specialize in a field related to textbook selection. Many of these are authors and/or educational consultants to publishing firms. Officers of the AMERICAN INDUSTRIAL ARTS ASSOCIATION and EPSILON PI TAU FRATERNITY are also included.

Teachers. Experienced teachers were selected from a class of industrial arts graduate students at The Ohio State University. The group of twenty-five men have an average of four years of teaching experience.

Comments Recorded. All of the members of the jury agreed to the general scope of the rating scale. These favorable comments have not been recorded. Only the critical reactions of each of these groups have been summarized in Table 11, Table 12, and Table 13 respectively.
TABLE 11
REACTIONS OF PUBLISHER'S REPRESENTATIVES TO TENTATIVE RATING TECHNIQUE

Only the items of the rating technique that were commented upon are listed below. The name of the publisher's representative precedes his suggestion for improving the form.

I. General Information

D. Date of Publication ______ Edition ______ Price ______

Mr. Fletcher - Some publishers give date of printing in place of copyright. Asking for the date of copyright may avoid this.

II. Content and Organization

A. Author's purpose as stated in Preface

Mr. Fletcher - Ask if this purpose recognizes the objectives of industrial arts.

D. Indicate which of the following helps for using the text are present:

Mr. Fletcher - Add student activities, evaluation, and study questions to the list.

List of Illustrations . . . . ___ ___ ___ ___

Mr. Stephens - This item is not too significant. The number of illustrations in some titles are too great for listing.

III. Adaptability

Mr. Stephens - Another point to consider in this section might be: Does it adequately cover the course for which it is being considered?

IV. Typography

A. 11 point type for text material ______ ______ ______

Mr. Stephens - 10 or 12 point type are standard.

E. Inner margins 3/4" . . . . ___ ___ ___ ___

Mr. Stephens - Does that indicate 3/4" for each page or 3/4" for the total gutter?
### Table 11 (Continued)

**F.** The total page measures about 8"x11" if many illustrations are used and about 4½"x7" if few illustrations are used.

Mr. Claude - It is a bit juvenile as written.

Mr. Fletcher - Neither 8x11 or 4½x7 is a standard book size. The matter of page size, it seems to me, is one which must include the appropriateness of page size to text and illustrations and to physical considerations in the use of the book.

Mr. Stephens - 4½"x7" is very small. 5½"x8" or 6"x9" give more adaptability.

**G. Heads in boldface, caps and lower case**

Mr. Fletcher - The best typography frequently avoids use of bold face types.

Mr. Stephens - Caps, letter spaced, are now thought more legible and attract attention more easily.

**H. Jobbing black ink**

Mr. Fletcher - Job black ink is not used primarily in book printing. Book black or halftone black are in general use.

**I. Bound with a stiff cover to open flat**

Mr. Claude - Not always possible to accomplish this these days.

Mr. Messmore - Some of our fine books are bound with semi-flexible cover.

Mr. Stephens - A stiff or flexible cover is a debatable issue. Perhaps a durable cover would be acceptable.
Mr. Claude advised that the State Department of Education for Texas, Oklahoma, Louisiana, and Florida have standards for textbooks. Each of these state departments sent a copy upon request. The standards recommended by each are almost identical and cover: weight and strength of paper, size of margins, stitching or sewing, backing, lining, casing-in, and covers. Most of this material is of a very technical and mechanical nature; therefore, is of little practical value for this type of rating scale. One recommendation that might be used is a minimum paper weight of 45 lb.

Mr. Stephens suggested adding an item regarding the appearance of the general make-up of the book, touching upon such details as: use of white areas, placement of illustrations, and combinations of type faces.

VI. Readability

13th to 16th Grades (quoted from Osburn and Wilber, Pewter)

Mr. Claude - The words 'college level' would be preferable to '13th to 16th Grades'.
TABLE 12

REATIONS OF LEADERS OF INDUSTRIAL ARTS
TO TENTATIVE RATING TECHNIQUE

Only the items of the rating technique that were commented upon are listed below. The name of the leader of industrial arts precedes his suggestion for improving the form.

I. General Information

Dr. Whitesel - The number of pages in the book may be recorded in this section.

II. Content and Organization

C. Are the above topics given thorough treatment in the text?

Dr. Brown - Ask if the author has achieved his stated purpose.

Dr. Ludington - The information given in C may be combined with topic B above it, to insure a more thorough evaluation.

Dr. Osburn - How could this question be answered if some topics are given thorough treatment and some are not?

D. Indicate which of the following helps for using the text are present:

Good Fair Poor

Dr. Hankammer - Other helps that may be listed are: Introduction, Footnotes, Visual Aids, and Glossary.

Dr. Osburn - The directions may be improved by stating:
Indicate your evaluation of each of the following:

Dr. Silvius - The directions need to be reworded.

E. Is the book free from bias or dogmatism? 

Dr. Wilber - This would be difficult to distinguish as we judge a book on the basis of our own bias.

F. Is the material up-to-date?

Dr. Osburn - This question may be related to the date of copyright.
TABLE 12 (Continued)

H. Does it appeal to boys and girls? ________________

Dr. Whitesel - Does it appeal to adults as well?

Dr. Warner - Another question would bring out a significant point: Is the book empirical or scientific?

III. Adaptability

A. Does the material of this book supplement work presented in other subjects of this school? ________________

B. Does the material of this book supplement work presented in other phases of the shop? ________________

Dr. Brown - These items should be taken into consideration by the teacher but not used for textbook evaluation.

D. Does it fulfill the purpose stated in the Preface?

Dr. Osburn - This does not fit in with adaptability.

IV. Typography

Conforms
Exactly-Nearly-Very little

Dr. Osburn - The headings do not give the proper directive for rating the points listed.

J. A cover of a medium tone with pleasing colors ________________

Dr. Hankammer - It should not show soil quickly. Also add the item: Any tables should be arranged so they can be read without turning the book, if possible.

Dr. Ludington - The quality of the cover cloth may be mentioned.

V. Illustrations. The following are characteristics of ideal illustrations. Check the illustrations to see how nearly they conform to the ideals.

Conforms
Exactly-Nearly-Very little

Dr. Osburn - The headings for the three columns do not seem proper to produce an evaluation.
I. Explanatory note, or a reference in text.

Mr. Bricker - This may be improved by changing it to read: Explanatory caption and a reference in the text.

K. Parts of diagrams clearly labeled.

Dr. Hankammer - Another item closely related to this is: Graphs, if any, should give correct picture of the facts.

Dr. Hankammer and Dr. Silvius suggested a provision to note the use of color.

VI. Readability or Reading Difficulty

Mr. Bricker - The paragraph for the 6th to the 8th grades is a little low.

Mr. Nihart - The paragraph for the 9th to 12th grade would be acceptable for the college level, also.
TABLE 13

REACTIONS OF EXPERIENCED TEACHERS OF INDUSTRIAL ARTS
TO TENTATIVE RATING TECHNIQUE

Only the items of the rating technique that were commented upon are listed below. The name of the teacher precedes his suggestion for improving the form.

SELECTION OF TEXTBOOKS FOR INDUSTRIAL ARTS

Mr. Nichols - The word 'TEXTBOOKS' should be changed to 'SOURCE BOOKS'.

Mr. Schramm, Mrs. Schuck, and Mr. Tierney - The word 'TEXTBOOKS' should be changed to 'REFERENCES'.

I. General Information

A. Title

B. Author

Mr. Nichols - A and B should be interchanged.

II. Content and Organization

A. Author's purpose as stated in Preface

Mr. Nichols - Is it the author's purpose for writing the book or the author's purpose for the use of the book?

B. Survey of Table of Contents to determine topics treated.

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Pages</th>
<th>% of Book</th>
<th>Topic</th>
<th>No. of</th>
<th>% of book</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

C. Are the above topics given thorough treatment in the text?

Mr. Tierney - Combine C with B to report if each topic is given thorough treatment.
TABLE 13 (Continued)

D. Suggestions for Projects

Mr. Gerbracht - Substitute the word 'activities' for 'Projects'.

F. Is the material up-to-date?

Mr. Schramm - Put an actual time limit to define 'up-to-date'.

H. Does it appeal to boys and girls?

Mr. Gerbracht, Mr. Readdick, and Mr. Shuck - This would be a difficult matter to judge without testing a group of students.

III. Adaptability

A. Does the material of this book supplement work presented in other subjects of this school?

B. Does the material of this book supplement work presented in other phases of the shop?

Mr. Emanick - These questions are not necessary.

Mr. Eachus - In question B, to what degree does the book supplement work presented in other phases of the shop?

C. To what advantage can this book be used in the laboratory?

Mr. Nichols - A list of advantages to check would make the question easier to answer.

Mr. Puryear - The question might not be understood.

Mr. Gerbracht - Part B uses the term 'shop' and Part C uses the term 'laboratory'.

J. A cover of a medium tone with pleasing colors.

Mr. Gerbracht - The significance of 'pleasing colors' is not understood.
TABLE 13 (Continued)

V. Illustrations

H. Spaced throughout the book ... ... ...

Mr. Eachus - Are they spaced according to topics?

Mr. Gerbracht - 'Distributed' would be a better word to use than 'spaced'.

Mr. Nichols - Add the question: Is color used?

VI. Readability

B. Is the material presented in small units that can be easily grasped? ...

Mr. Gerbracht - This question may be reworded to ask: Is the material presented in units of appropriate length for the grade level of the students?

9th to 12th Grades and Adults (Revised from Osburn and Wilber)

6th to 8th Grades (Revised from Osburn and Wilber)

Mr. Lembright, Mr. Nichols, and Mr. Schramm. Each man proposed slight revisions of the two revised paragraphs to make them easier to understand.

Several of the men commented on the small amount of space allowed to answer some of the questions. The tentative form was crowded to limit it to a four-page presentation. Due consideration will be made on the revised form for the proper amount of space needed to answer the questions.
The application of the tentative rating technique to eleven books indicated the method was a practical one to use in evaluating books. It took from one hour to one and one-half hours to examine one book. This variation was due to the length of the book.

The reactions of the men who examined the rating technique indicated that the scope and method were acceptable criteria for judging books. However, they did suggest changes in several items to improve the form. In order to take advantage of these suggestions Chapter VI deals with the revision of the form.
Chapter VI
REvised Rating Technique

The jury that inspected the tentative rating technique agreed with the scope and treatment suggested to evaluate textbooks. However, they made several suggestions to improve the form. Each suggestion was carefully considered in view of its possibilities to make the points clearer and more specific. This chapter presents the rating technique in the revised form.

This rating technique was produced in mimeographed form to use in evaluating textbooks. In designing that form it was possible to reduce the width of the margins to 3/4 of an inch on each side, thus allowing more room to improve the utility of the form.

The items listed in the rating technique permit an analysis of the factors that establish the value of a book. If they are carefully inspected, the judge will be able to make a clear estimate of the adaptability of the book to the teaching situation.

THE SELECTION OF TEXTBOOKS FOR INDUSTRIAL ARTS

To the industrial arts teacher, supervisor, or critic:

Modern industrial arts laboratories make wide use of texts and references. The value of this collection of books depends upon the care used in their selection. This rating technique gives a relatively objective guide to aid in the careful analysis of a book for industrial arts.
I. General Information

A. Author _______________________________________

B. Title _______________________________________

C. Publisher ____________________________________

D. Publisher's Address ___________________________

E. Date of Copyright ________ Edition _________

F. Price __________ Total number of pages ______

II. Content and Organization

A. Author's purpose for the use of the book (as stated in the Preface)

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

B. According to this purpose, how can the book be adapted to an industrial arts program? ______

_____________________________________________________________________

_____________________________________________________________________

C. Survey the Table of Contents and list the topics treated. Then inspect the text to see if each topic is given thorough treatment.

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Pages</th>
<th>Is the topic given thorough treatment?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Additional topics may be listed on the back of this page.
D. Does the book fulfill the purpose stated in the Preface? ________________________________

E. Does it appeal to girls as well as boys? ______

F. Is the book empirical or scientific? __________

G. Indicate your evaluation of the following:

<table>
<thead>
<tr>
<th></th>
<th>Good</th>
<th>Poor</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paragraph Headings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggestions for Activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summaries (or Study Questions)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bibliography</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>List of Visual Aids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glossary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. Typography. The following factors are for an ideal textbook. Naturally, all books will vary, but should conform to many of these specifications:

<table>
<thead>
<tr>
<th></th>
<th>Conforms</th>
<th>Does not Conform</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 10 to 12 point type for text material</td>
<td>_____</td>
<td>___</td>
</tr>
<tr>
<td>B. Lines 2½ to 5 inches long</td>
<td>_____</td>
<td>___</td>
</tr>
<tr>
<td>C. Leading two points</td>
<td>_____</td>
<td>___</td>
</tr>
<tr>
<td>D. Dull finish paper; opaque; an ivory tint if color is used</td>
<td>_____</td>
<td>___</td>
</tr>
<tr>
<td>E. Minimum weight of paper - 45 lb.</td>
<td>_____</td>
<td>___</td>
</tr>
</tbody>
</table>
III. Typography (Continued)

F. Inner margins 3/4" per page ________________________ Conforms

G. Pages as large as 8" x 11" only if heavily illustrated; 6" x 9" when few illustrations are used ________________________ Conforms

H. Heads in caps, letter-spaced ________________________ Conforms

I. Book or halftone black ink ________________________ Conforms

J. Bound with a semi-flexible or stiff cover to open flat ________________________ Conforms

K. A cloth cover of a medium tone that does not show soil quickly ________________________ Conforms

L. Tables arranged to be read without turning the page ________________________ Conforms

M. Is the general makeup inviting?
   1. Disposition of white areas: Good__ Poor__
   2. Placement of illustrations: Good__ Poor__
   3. Combination of type faces: Good__ Poor__

IV. Illustrations. The following are characteristics of ideal illustrations. Check the illustrations in the book to see how nearly they conform to the ideals.

A. Placed as near to point of reference as practical ____________ Conforms

B. Clear and precisely to the point ____________ Conforms

C. Not crowded ____________ Conforms

D. Authentic ____________ Conforms

E. Numbered consecutively throughout the book ____________ Conforms

F. In photographs the main object stands out in contrast with the background ____________ Conforms

G. Those grouped together all relate to one theme ____________ Conforms
IV. Illustrations (Continued)

<table>
<thead>
<tr>
<th>Conforms</th>
<th>Does not Conform</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Distributed throughout the book</td>
<td></td>
</tr>
<tr>
<td>I. Explanatory caption, and a reference in text</td>
<td></td>
</tr>
<tr>
<td>J. One specific point without complicating evidence</td>
<td></td>
</tr>
<tr>
<td>K. Parts of diagrams clearly labeled</td>
<td></td>
</tr>
<tr>
<td>L. Logical order of steps for processes</td>
<td></td>
</tr>
<tr>
<td>M. Color is used</td>
<td></td>
</tr>
<tr>
<td>N. Number of illustrations that suggest activities to be carried out in the laboratory</td>
<td></td>
</tr>
<tr>
<td>O. Number of illustrations in the book</td>
<td></td>
</tr>
</tbody>
</table>

V. Readability or Reading Difficulty

A. Is there a simple flow of related ideas with good transitions?     

B. Is the material presented in small units that can be easily grasped?     

C. Can the reader see an application of the material presented?     

D. The following three paragraphs are examples of reading that can be understood at different grade levels. To establish a level of difficulty for the book you are rating, select a paragraph from every tenth page and compare it with the three sample paragraphs. Record the average grade level for the textbook.

The textbook may be used successfully at higher grade levels than that indicated by the average grade level established. In any grade there may be some children whose reading ability will vary from these average norms.
College Level (Quoted from Osburn and Wilber, Pewter)

"The 'Story of Pewter' is a narrative of service to mankind. Pewter has played an important part in the development of civilization, both as a medium for artistic expression and as a material from which domestic utensils were fashioned. The bronze used by the ancients was composed of a large percentage of copper and a smaller amount of tin. Now the complement of this alloy, that is, a large proportion of tin with a small amount of copper, gives an excellent form of pewter. Whether the reversal of the proportions of these two metals came first as an accidental mismeasurement of the two ores, or whether it was due to experimentation, whether aimless or purposeful, has not been determined."

9th to 12th grades and ADULTS (Revised from Osburn and Wilber)

The "Story of Pewter" is a narrative of service to mankind. Pewter has played an important part in the development of civilization for two reasons. First, it has been a metal that artists could easily shape into pleasing form. Second, it was used to make many useful domestic utensils.

Bronze was first used a long time ago and was made of a large percentage of copper and a smaller amount of tin. An excellent form of pewter consists of the same two metals, but in a different proportion. This pewter has a larger amount of tin and less copper.

How the proportions of the two metals became reversed to produce pewter has not been determined.

6th to 8th grades (Revised from Osburn and Wilber)

Pewter is a metal used in our everyday life. For a long time it has been used to make pots and pans for our homes. It also has other uses. For example artists make very beautiful vases from this shiny, white metal.

Do you know that pewter is made of two very common metals? They are tin and copper, which are melted together. The best pewter has a large amount of tin and just a little copper.

If you are not careful when you measure the tin and copper you will not be able to make pewter. Too much copper in the mixture will cause it to be a different metal. This would be called bronze.

Bronze was used many years before pewter. Perhaps someone, trying to make bronze, made a mistake in measuring tin and copper, and made pewter.

No one is certain if that is what happened. Maybe someone tried using different amounts of tin and copper.
When they used a lot of tin and just a little copper, they found it made a good metal to work with, and they called it pewter.

Grade Level of Textbook

VI. Adaptability

A. What types of information does this book supply?
   Technical data ...........................................
   Description of tools and machines ..................
   Explanation of processes ............................
   Related Information .................................
   Suggestions for activities ........................

B. In what grades can this book be used?
   6th to 8th grades ..................................
   9th to 12th grades .................................
   College level ......................................
   Adult level ......................................

C. How can this book be used in your laboratory?

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

If more space is needed use the back of this page.

D. Do you wish to purchase this book? ................
Chapter VII

IMPLICATIONS FOR THE INDUSTRIAL ARTS PROFESSION

A technique for rating industrial arts textbooks is of little value unless the men of the profession use it to make a wise selection of textbooks. This chapter will suggest a plan to put this device into actual practice.

Teacher Education. Most industrial arts laboratories have a library or use textbooks for classwork. With the necessity for textbooks well established, teacher education for industrial arts should undertake the problem of improving the quality of the literature found in the laboratories. The rating technique presented in this thesis can be used as a basis for presenting this matter. The topics treated therein can be discussed in further detail in the education classes. If industrial arts teachers are taught to make wise selections by using this rating technique, the best books will be found in their libraries. This also will induce publishers to produce better books in order to sell them.

Leadership Program. The teachers who use this rating technique need assistance to direct their efforts to the greatest advantage. They need to know the newest books published so they can secure copies on approval. Having their name included on publishers' mailing lists is one way to keep informed on the publication of new books.

The professional organizations, the AMERICAN INDUSTRIAL ARTS ASSOCIATION and its affiliates, and EPSILON PI
TAU FRATERNITY can serve the profession by acting as an editorial agency for reporting new publications. These organizations can compile and edit the findings of a group of research men and circulate the results among the teachers who need the information. The teacher, after surveying this list, may select books pertaining to the subject he is teaching and order the book on approval. An examination using the rating technique should be an essential requirement in deciding whether to purchase the book or return it.

**Improvement of Libraries.** The rating technique should be used periodically to survey books in the industrial arts library. This survey would help determine which books have become out-dated, and which books have been replaced by books of better quality. On this basis it may be necessary to dispose of several books. A survey of this type may also show the need for special types of books to supply the students with the information they need to supplement the course.

The widespread use of this rating technique would improve the quality of the literature used in industrial arts laboratories. This would place better materials in the hands of the students, providing them with the opportunity for a better education. A glance at the world situation today leaves little doubt as to the need for an improved educational program.
Possibilities for Further Studies. Problems related to this study have been considered but not investigated and reported in this thesis. Some of them that might be worthy of further study are:

1. How publishers can contribute to the improvement of industrial arts literature.

2. How authors and editors can contribute to the improvement of industrial arts literature.

3. Preparation of an annotated bibliography of books related to a program of industrial arts. This should be revised periodically.

4. Experimentation in the use of this rating technique by several industrial arts teachers.

5. Significance of readability for assisting students in the use of the library.

6. Survey of industrial arts libraries using this rating technique resulting in suggestions for improving both the libraries and the rating technique.

Appendix A

APPLICATION OF THE DALE FORMULA

The use of the Dale Formula is restricted to the members of the Curriculum Division of the Bureau of Educational Research, The Ohio State University. Special permission was given to use it for this thesis study. It was used under the guidance and direction of Dr. Edgar E. Dale.

The report in this appendix shows all of the work required in using the formula except the mathematical computations using the prescribed weights and constants.

The words underlined in the sample paragraphs are the words not given on the Dale Word List.

I. Pewter, Osburn and Wilber (Appendix B)

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Page # of sample</th>
<th># of Words</th>
<th># of Sentences</th>
<th># words not on Dale List</th>
<th>grade level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>119</td>
<td>5</td>
<td>34</td>
<td>13-15</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>99</td>
<td>5</td>
<td>21</td>
<td>9-10</td>
</tr>
<tr>
<td>3</td>
<td>37</td>
<td>99</td>
<td>4</td>
<td>15</td>
<td>9-10</td>
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<tr>
<td>4</td>
<td>61</td>
<td>94</td>
<td>5</td>
<td>10</td>
<td>7-8</td>
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<tr>
<td>5</td>
<td>83</td>
<td>94</td>
<td>6</td>
<td>23</td>
<td>11-12</td>
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<tr>
<td>6</td>
<td>101</td>
<td>108</td>
<td>5</td>
<td>10</td>
<td>7-8</td>
</tr>
<tr>
<td>7</td>
<td>121</td>
<td>101</td>
<td>5</td>
<td>18</td>
<td>9-10</td>
</tr>
</tbody>
</table>

Grade level for book 9-10
Sample #1:

The "Story of Pewter" is a narrative of service to mankind. Pewter has played an important part in the development of civilization, both as a medium for artistic expression and as a material from which domestic utensils were fashioned. The bronze used by the ancients was composed of a large percentage of copper and a smaller amount of tin. Now the complement of this alloy, that is, a large proportion of tin with a small amount of copper, gives an excellent form of pewter. Whether the reversal of the proportions of these two metals came first as an accidental mismeasurement of the two ores, or whether it was due to experimentation, whether aimless or purposeful, has not been determined.

Sample #2:

Ability to recognize and appreciate the pewter of early American craftsmen depends somewhat upon a knowledge of the "touch" mark which they placed upon their pieces. This system of marks grew out of and was patterned after the English system. In America, however, the lack of any strong organization like the "Worshipful Company" gave more freedom for change and development in the matter of type. It also probably accounts for the fact that much early pewter was unmarked. For this reason it is sometimes suggested that an unmarked piece is more likely to be American than English or Continental.

Sample #3:

After soldering the joint, true up the body on a stake until the base will closely fit a circle drawn to the diameter shown on the working drawing. Fold a piece of heavy paper and cut to the approximate shape and size of the spout. Alter this pattern by trial until it fits the body of the cone (Fig. 61), then paste onto a piece of pewter and saw to shape. The spout should be filed and tested until a tight joint is secured, then the body cut away inside the spout almost to the inner edge (Fig. 62).

Sample #4:

The top of the stake should be on a level with the worker's elbow. Hold the planishing hammer well back on the handle, keeping the arm and handle in a straight line, as in Fig. 133, with the elbow close to the side. The arm should be raised slightly and the wrist bent upward lifting the hammer one or two inches above the metal. Only slight effort is necessary to deliver a blow of sufficient weight. The hammer must strike the metal squarely so that the edge of the face will not leave a mark.

Sample #5:

The candle socket may be made by the same process that was used for the ink bottle holder. The tray may be beaten down in a mold similar to that used for the porringer.
Fourteen-gauge pewter should be used for the bracket. This metal is shaped over a wooden stake and planished to give stiffness. Solder the parts and clean as previously described.

Ornamental Inset. A device for adding interest to some spot or appendage is that of setting in a decorative piece of copper or other metal, a stone, plastic, or ceramic ornament.

Sample #6:
Press the ring into one piece with the setting or seal near the top surface. Press the other part of the bone in place, entirely enclosing the ring. Then, holding the pieces carefully together, even off the top edges where the bone was sawed apart, and also the two sides. Now if guide marks are placed on the sides, it will be possible to take the pieces apart and replace them in the same position. When the mold is taken apart it will be found that there is a complete impression of the ring, but the seal or inscription on the top has, of course, been scraped out.

Sample #7:
Turn a chuck for the bowl of the ash tray and reduce the diameter all over just enough to allow for 18-gauge metal to bring the over-all dimensions to those indicated on the drawing. Take care that the curves are smooth and regular, with no noticeable sharp projections, or flat parts. Prepare a follow-block slightly smaller than the base of the chuck and fit it to the revolving center. Proceed as before to center the metal, force it over the foot of the chuck, trim and straighten. Lubricate the surface of the metal by holding tallow or cup grease against it.

II. Your Craft Book, Newkirk and Zutter (Appendix B)

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Page # of Sample</th>
<th># of Words</th>
<th># of Sentences</th>
<th># Words not on Dale List</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>116</td>
<td>8</td>
<td>7</td>
<td>5-6</td>
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<td>2</td>
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<td>105</td>
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<td>7-8</td>
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<tr>
<td>3</td>
<td>109</td>
<td>100</td>
<td>6</td>
<td>8</td>
<td>5-6</td>
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<td>4</td>
<td>149</td>
<td>112</td>
<td>7</td>
<td>11</td>
<td>7-8</td>
</tr>
<tr>
<td>5</td>
<td>186</td>
<td>93</td>
<td>7</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Grade level for book 5-6
Sample #1:
A toy or a game is fun either in the home or out of doors, for warm or cold weather, for sunshine or rain, and for both girls and boys. All the toys illustrated can be made of most simple materials that are easy to obtain and fun to work with.

Perhaps you wish to make a little gift for your brother, sister, or friend; it might well be a birthday or a Christmas gift. You may be wanting something to donate for a sale to raise funds; your club or class may be filling Christmas boxes or baskets. There are several suitable toys and games you can find in this chapter to answer these needs.

Sample #2:
Ghosts, goblins, costumes, parties, masks, and spooky stories are all mixed together to create the excitement of Hallowe'en. Black and orange are the standard colors for this season. You will want to make everything: greeting cards, invitations, decorations, costumes, masks, and jack-o-lanterns. You will also want to be prepared with ideas for games and ghost stories.

Autumn colors, with their yellows, oranges, and browns, usher in the Thanksgiving holiday. You will want to prepare the decorations and the setting for the Thanksgiving dinner. Let the autumn colors and suggestions help. Use the gaily colored leaves for decorations, and make nut baskets for the table favors.

Sample #3:
Cut a strip of tarleton cloth or of crepe paper 4 3/4 in. wide and 10 in. long. Sew a running stitch through the center of this strip, and gather the strip to form a double ruffle for the skirt.

Fold the tab at the bottom of the figure and tie the gathering string around the folded tab. Slip a rubber band over the tab holding the gathering string that is tied. Glue or paste the tab to the back of the figure.

Slip two of your fingers through the rubber band with the puppet on the back of your hand.

Sample #4:
Clay seems to be the material in which we can find the third dimension. Here we find it a form of play to construct and model objects. You feel the shape of the object and model it as you see it from all directions. You see not only the front of it as if you were drawing, but all the sides and the top and bottom as well.

The illustrations show the clay in different colors. There are two kinds of clay, water and oil. Water clay is a gray powder that is mixed with water and can be modeled and then dried again or fired in a kiln to make pottery.
Sample #5:
Paint the inside of one plate. Cut another plate in half and decorate the back of it with tempera.

Hold the half-piece onto the whole plate and punch five holes along the edge. Fasten the plates together with paper fasteners through the holes you have punched.

Punch two more holes at the top, each 1 1/2 in. from the center. Tie a string through these holes so that the plates can be hung up and used for a wall pocket. This is for the kitchen and makes a nice gift for your mother.

III. Household Mechanics, Bedell and Gardner (Appendix B)

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Grade level for book 7-8
Sample #1:
Wood is probably more widely used for construction and repair purposes than any other material. For this reason everyone should know how to use it, what it is used for and how to care for things made of it. This unit of study is intended to give the information which will be most valuable to everyone.

There are many things about wood that the worker should know before he starts to work with it. Here is a brief summary of the more important things.

The forests of the whole world are the source of supply for lumber. The United States furnishes large quantities of both hard and soft wood.

Sample #2:
Care must be used in making anything that is worth while.

Materials which are ordinarily thrown away can be used for this job. However, a piece of wood with an attractive grain is suggested. Odd shaped pieces of a tree limb can be shaped into very attractive designs.

An ordinary jack knife, and some small pieces of sandpaper are enough. A lead pencil will be found handy in laying out the design.

Here are some suggestions for making a letter opener out of the limb of a tree. The design will depend on the shape of the limb to be used.

Sample #3:
Different fluxes, prepared for various metals, can be purchased ready for use. Some fluxes are made for soldering all metals, while others for only one. Sal ammoniac is usually the best for tinning soldering coppers. Rosin is good for soldering tin, or for all metals that are scraped or filed bright. Killed acid, made by dissolving zinc in muriatic acid until it stops boiling is good for soldering zinc or galvanized iron. The druggist will mix five drops of hydrochloric acid to an ounce of glycerine as a flux for soldering copper, brass, and pewter.

Sample #4:
Metal boxes can be used for a number of things around the home. On account of fire they are much safer than wooden boxes for holding ashes. But a metal box of the right size cannot always be readily found. Why not make a box just the size and shape that is needed?

One piece of sheet metal large enough for the complete box, and at least four soft iron rivets. The box shown here requires four rivets. Boxes with higher sides require more. Generally 8-ounce rivets are used for lightweight sheet metal, but common nails may be cut to the proper length for rivets.
Sample #5:
A wire brush is used for removing paint scales and other material from the surface in outside painting.

A wire hook is necessary for fastening the pail if one has to work standing on a ladder. This leaves one hand free to use in holding to the ladder.

A paint can with a bail will be needed to dip the brush in while painting. It should be of a size which is convenient to use. It should be large enough to allow plenty of room for dipping the brush without touching the edges. The can should never be filled more than half full.

Sample #6:
All interior woodwork, chairs and tables are much easier to keep clean if they are painted. Many small jobs of painting can be done very well by the home workman. The improvement in appearance and sanitation is well worth the time and expense. It is a common practice now to buy unpainted furniture and paint it at home.

Here are the materials you will need:
A can of enamel undercoating and a can of enamel the same color. Turpentine will be needed for thinning the first coat of enamel undercoating.

Putty will be needed for filling cracks and nail holes.

Sample #7:
Wax may be applied after any of the coats of varnish or after any finish. Do not apply it between coats of varnish, because varnish will not stick to a waxed surface.

Use ordinary furniture wax. Place a small amount inside several thicknesses of cheese cloth, and apply to the surface. Allow ten minutes for drying and then polish briskly. (See Fig. 213)

Apply a second coat and allow it to dry for an hour. Polish as before. The more it is polished, the better the finish will be. More wax will not help much.

Sample #8:
This means that the type of wire has been inspected by the Bureau and approved for use in house wiring.

Electric wires are sometimes run through metal or plastic conduit. Conduit has been replaced during recent years by other types of wiring. However, there are some instances where it is still used. Conduit should always be used where the electric wires from the power line enter the house. It may be used on basement walls or places where unprotected wires are apt to be damaged. Conduit is used when running wires inside of a concrete wall. The household mechanic should leave all conduit work for the licensed electrician.
Sample #9:
The electric circuit has been discussed earlier in this chapter. In Fig. 239 it was shown how electric current passes from the source, through the appliance, and back to the source, making a complete circuit. Electric circuits in a house are the same except that the generators at the local power company are the source instead of the dry cell. In our discussion of the house circuit, we will refer to the service switch as the source of electricity, since the power company ends its responsibility at that point.

When a house is wired for electricity, the power company runs its wires to the house, through a meter, and then to a service switch.

Sample #10:
A short circuit often occurs in a door bell circuit. Wires may have been run too closely together, or some metal object may be touching both wires. When this happens, the short circuit must be found and corrected before the door bell will work. This job will test the skill of the household mechanic.

When a short circuit occurs in a door bell circuit, one of the conditions is usually true. There may be a short at A, or at any place between the source and the push button, or between the source and the bell.

Sample #11:
The rattling noise in faucets or valves is usually caused by a loosely-assembled part. Therefore, if a faucet is properly assembled it should not rattle. Sometimes, however, the rattle is caused by the water pipe vibrating against the inside of the wall, or against a floor joist. If the place where it strikes can be reached, a piece of wood or cloth may be forced between the pipe and wall or joist. If the place cannot be reached, there is very little that can be done about it.

The flushing tank is a reservoir which holds enough water to cleanse the toilet bowl.

Sample #12:
Butt hinges are those set into the edge of the door so that only the working part of the hinge may be seen. Loose pin butt hinges are used on house doors. Notice that the pin is always on the inside of a room or of a house, since doors open toward the inside. The pins may be taken out and the door removed should the lock fail to work. The riveted-pin butt hinge is commonly used on cupboard doors which are kept locked.

Surface hinges are installed on the outside surface of a door, gate or lid.
Sample #13:
This is to prevent rain from coming through between the sash at this point. If the stops fit too closely to the sash there will be difficulty in raising or lowering the sash. The rubbing surfaces had better be oiled. Wood stops must be kept painted, and paint is apt to cause them to stick. They must be freed after each painting. The new type metal stops are used as both stops and weather stripping. They do not usually stick, and the working surfaces do not require painting, since they are made of rust-proof metal. A carpenter can install metal weather stripping on old windows.

Sample #14:
Storm windows require about the same care as ordinary windows and screens. They are installed in the fall when screens are removed. In the spring they should be removed, repaired and painted if necessary before they are stored for the summer. They can be stored in the same place used for screens in the winter. Painting, replacing glass or replacing putty can be done in exactly the same manner as for the regular window.

A casement window is, as we have said before, a window which is hung on hinges. In modern houses, casement windows are usually made of steel.

Sample #15:
How often have you stopped in front of a hardware store display of tools and said, "Boy! I wish I had all those tools"? If somehow your wish had been granted, the chances are that you would not have known what to do with them after they were in your possession. The successful home workshop is not usually outfitted that quickly. The home workshop usually starts with a few tools, and a person who actually uses them. He may not be an expert craftsman, but he must have an interest in working with tools.

Sample #16:
Most people enjoy a picnic where they can toast wiener and marshmallows, but sometimes sticks to toast them on are rather scarce, and even then, sticks are clumsy. A simple home made toasting fork, made from wire, is much better. They are simply and easily made.

The only material necessary is a piece of No. 10 wire, about twice the length of the fork desired. If the fork is to be longer than about 30", a heavier wire should be used. The tools you will need are a pair of pliers, wire cutters, and a stick with which to twist the wire.
Sample #17:
As stated before in this chapter, people are often oversold on home workshop tools and equipment. This is particularly true of machinery. People who have had no experience or training in tool operations, often get the idea that machinery is all they need to turn out beautiful work. This is far from being true. The sloppy workman with hand tools is usually a sloppy workman with power machinery. A machine will do an operation perfectly if the operator has the skill and knowledge necessary to operate it properly. But a machine does not think.

IV. Welding and Its Application, Rossi (Appendix B)

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The manipulation of the welding arc may be properly learned by anyone having average intelligence and a steady hand. Previous mechanical training will help the prospective welding operator to become proficient but is not essential. A full understanding of the requirements of the welding arc will prove an invaluable aid.

In the manual metallic-arc-welding process, it is desirable to grip the electrode at the end remote from the arc terminal so that the entire length can be deposited without breaking the arc. But sometimes, to avoid overheating, very small electrodes and coated electrodes of extra length are provided with an exposed section in the center for the electric-holder grip.

V. Forging Practice, Johnson (Appendix B)

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Lack of chemical homogeneity in steel is largely due to segregation occurring during the solidification of steel in the ingot mold. When cast ingot steel solidifies, the outer surface in contact with the surface of the mold becomes solid first, and because selective freezing takes place when alloys similar to steel solidify, the uniformity of composition of the liquid steel is destroyed. The first portion of the ingot to freeze is apt to be low in carbon, phosphorus, and other elements, as well as nonmetallic inclusions; the last portion to freeze is apt to be rich in these constituents.
APPENDIX B

INDUSTRIAL ARTS BOOKS USED FOR EVALUATION AND RATING


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APPENDIX C

COVER LETTER REQUESTING REACTIONS
TO TENTATIVE RATING TECHNIQUE

839 Seymour Avenue
Columbus 5, Ohio
July 11, 1947

Dear __________:

The attached form is a proposed technique for use in the selection of industrial arts textbooks.

Please pencil your reactions critically on the form concerning: its scope, significance, and anything else you feel I should know before putting it into use.

Kindly place the edited form in the enclosed self-addressed and stamped envelope and mail it to me by August 1st.

I am a master's candidate at The Ohio State University and your reaction to this phase of my thesis will be received with keen interest.

Respectfully,

/s/ Harold G. Gilbert

Harold G. Gilbert

Approved:

/s/ William E. Warner

William E. Warner
Names of publisher's representatives who were sent the Tentative Rating Technique:

1. Mr. John Claude, Jr.
The Bruce Publishing Co.
Milwaukee, Wisconsin

2. Mr. Kenyon S. Fletcher
D. C. Heath & Co.
Boston, Massachusetts

3. Mr. Chester Messmore
International Textbook Co.
Scranton, Pennsylvania

4. Mr. W. D. Stephens
McKnight & McKnight
Bloomington, Illinois

Names and Addresses of Industrial Arts Leaders who were sent the Tentative Rating Technique:

1. Mr. D. Arthur Bricker
Board of Education
Cincinnati, Ohio

2. Dr. Kenneth W. Brown
Board of Education
Philadelphia, Pennsylvania

3. Professor George B. Cox
State College
Corvallis, Oregon

4. Professor E. E. Ericson
State College
Santa Barbara, California

5. Professor Carl E. Frankson
State Teachers College
Newark 4, New Jersey

6. Dr. Otto A. Hankammer
State Teachers College
Pittsburg, Kansas
7. Professor John J. Hatch
Centerville, Massachusetts

8. Dr. R. Lee Hornbake
University of Maryland
College Park, Maryland

9. Dr. DeWitt Hunt
Oklahoma A & M College
Stillwater, Oklahoma

10. Professor Hartley E. Jackson
State College
San Jose, California

11. Dr. John P. Ludington
State College
Raleigh, North Carolina

12. Dr. Louis V. Newkirk
Board of Education
Chicago, Illinois

13. Mr. Claude E. Nihart
Board of Education
Los Angeles, California

14. Professor Milo T. Oakland
State Teachers College
DeKalb, Illinois

15. Dr. Burl N. Osburn
State Teachers College
Millersville, Pennsylvania

16. Dr. G. Harold Silvious
Wayne University
Detroit, Michigan

17. Dr. Heber A. Sotzin
State College
San Jose, California

18. Professor Anthony T. Stavaski
State Teachers College
California, Pennsylvania
19. Dr. William E. Warner  
The Ohio State University  
Columbus 10, Ohio  

20. Dr. Gordon O. Wilber  
State Teachers College  
Oswego, New York  

21. Dr. Walter R. Williams  
University of Florida  
Gainsville, Florida  

22. Dr. John A. Whitesel  
Miami University  
Oxford, Ohio  

Sixteen of the twenty-two leaders returned the tentative rating technique with comments added.
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   Carlton J. Gerbracht
   Harold G. Gilbert
   Paul L. Keintjes
   John P. Lisack
   Kenneth Phillips
   William E. Warner


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