A PLAN FOR AN ANNUAL INDUSTRIAL ARTS SHOP REPORT
TO THE PRINCIPAL

A Thesis Presented for the
Degree of Master of Arts

By

Arthur G. Henke, B. A.

THE OHIO STATE UNIVERSITY
1946

Approved by:

Robert E. Smith

OHIO STATE UNIVERSITY
PREFACE

In order to characterize the period of time in which we live, the kind of education which points up the philosophy and remarks of this paper it can best be explained as Mearns has written in his book, The Creative Adult.

...a multitudinous creative output in the greatest art period of America’s history. Go, have a look, listen; expose yourself to the thing itself. Do not take our word for it; get a word for it yourself. Do not be content to read about it; experience it. Do not ask if it is good or bad; put yourself in touch with it. Do not even inquire if you like it; let it slowly do things to you. This is not education by hearsay; it is education by exposure to an influence. (p. 127)

This embodies the philosophy of the writer in developing a plan for an annual industrial arts report to the principal, which may result in crystalizing some ideas in the minds of other teachers of industrial arts which might be used and applied in some future attempt on their part for improving their programs of industrial arts education in a community.

In the creative arts it is a mistake to dwell exclusively upon literature, music and painting, beautiful and alluring, when in the region of the practical, the creative spirit is most apparent and productive in industry. Science stems from this area, medical research, the latest automobile, and the comforting miracles of modern invention.
The source of man's best practical productions are yet unknown to the mathematician, the physicist, the architect, who first broods over his problem, accumulating subconsciously the elements of solution, clarifying even the nature of the problem and then one day the creative intelligence flashes a hypothesis, a solution, and a way out.

Individual hypotheses at variance with the world's accepted judgements are so common that the creative educationalist guarantees to find them anywhere. In moving among soldiers, trained "not to think", these hypotheses are unearthed on every side. The common soldier, really a common civilian dressed up in baggy khaki, knew exactly what was wrong with the salute, reveille, the moral poster of "the good soldier boy"—they used to curse that sweet smiling, neatly dressed prig for the shame it put upon them, although a famous artist's named was signed to the drawing -- and they had swift and just summaries for every noncom and officer over them. Their instantaneous judgements were in the main the private conclusions of their more intelligent superiors.

Superiors are not always intelligent, however; that gives the creative subordinate his chance and his right to come to judgement. All generals look foolish after any war. Why did not the Germans break through to Calais and Dover at the time when, as we now know, they could have done so with ease? The space was open and practically undefended. The military historian, if he were free to
say what he really knows could show up the ineptitude of any command.

Young officers at general staff headquarters have watched in amazement the stubborn and disastrous conventions of their superiors. A captain writes in his diary, "We are getting ready to throw ten thousand men with rifles against an enemy who knows exactly when we are coming; they are now waiting -- with machine-guns. Only a few weary-eyed and silent men see the folly of it."

Theodore Roosevelt made a general out of a captain because, he said he could not find anybody else who would cut the red tape -- that is, snap out of conventionalized imprisonment -- and get things done.

There is a similar lack of intelligence in business thinking. A young clerk sees the stuffed files, unused and ineffective, cases of dictation incorrectly titled, the expensive delay in making decisions, the offensive follow-up, the wasted advertising. If he speaks out, he may lose his job.

The student in creative education soon discovers, to take further example, that the world is ready to worship the man or woman who is the first to do something daring. It is with this creative subordination in mind that the writer wishes to take liberty in developing some original ideas.

The writer wishes to acknowledge an initial stimulation toward this study by some things which Dr. William E. Warner
unknowingly has said and done. The success of this study as a thesis really lies in the ability of Dr. Robert E. Smith to judge people and advise them by saying and doing just the right thing in the proper proportions at the right time, in a way to produce the most effective results.

It has been the greatest pleasure for the writer to apply his thought to this study which affects his interest so much, *A Plan for an Annual Industrial Arts Shop Report to the Principal.*
# CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Introduction</strong>&lt;br&gt;Definition of the annual shop report</td>
</tr>
<tr>
<td>2</td>
<td><strong>Essential Constituents of the Report</strong></td>
</tr>
<tr>
<td>3</td>
<td><strong>Procedure and Study</strong>&lt;br&gt;The development of a philosophy</td>
</tr>
<tr>
<td>4</td>
<td><strong>The Plan for Writing and Organizing the Report</strong>&lt;br&gt;Philosophy</td>
</tr>
<tr>
<td>5</td>
<td><strong>Finishing and Distributing the Report</strong>&lt;br&gt;Editing and rewriting&lt;br&gt;Reproduction and printing&lt;br&gt;The floorplan&lt;br&gt;Photographs and illustrations&lt;br&gt;The plan of distribution</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td>1939-1940</td>
<td>Annual Industrial Arts Report</td>
</tr>
<tr>
<td></td>
<td>West Des Moines, Iowa</td>
</tr>
<tr>
<td>1940-1941</td>
<td>Annual Industrial Arts Principal's Report</td>
</tr>
<tr>
<td></td>
<td>University High School, Iowa City</td>
</tr>
<tr>
<td></td>
<td>Pupil Personnel Organization</td>
</tr>
<tr>
<td></td>
<td>West Des Moines, Iowa</td>
</tr>
<tr>
<td></td>
<td>Pupil Inventory and Progress Forms</td>
</tr>
<tr>
<td></td>
<td>Principles of Industrial Arts Planning, Developed at Ohio State University</td>
</tr>
<tr>
<td></td>
<td>Principles of Industrial Arts Equipment Selection, Developed at Ohio State University</td>
</tr>
<tr>
<td></td>
<td>Examples: Industrial Arts Equipment Specifications, A Committee Release for the State of Ohio</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

This chapter provides a background for a better understanding of what is developed in the chapters that follow. The purpose of the study, the definition of the problem, and the identification of those things which have been specifically considered at this time, are brought together here with the implications for further concern.

Generally, there has been a felt need for better school reports, and public relations, for all phases of the secondary educational system. This is particularly true in regard to the school in the community. Various educational associations have required schools to make annual reports, few of which deal with data of interest to the average layman. This does not change the fact that there are many things that happen in the school which almost every citizen, interested in his community life, would like to know. In this day of growing investigations of all sorts of happenings, military, governmental and world relations, it seems quite fitting to look forward toward developing some good public relations for education. A better public attitude can be fostered by presenting information to be considered constructively, rather than continually requiring the public to view reports that are critical in nature.
Education has for a long time let its graduating class serve as the only media of advertising. Certainly there is little question in assuming that it pays to advertise, especially when it concerns an important problem such as the education of all American youth. Figuratively speaking there are many things for one to learn when he lays his cards on the table.

There is a need of public relations for general education in the secondary school, to be developed on a basis of common understanding between the schoolmen and the layman. The problems involved in the teaching of English, the teaching of mathematics, the teaching of natural science, the teaching of industrial arts, the teaching of home economics and the teaching of agriculture, together with the course of study content and the methods used in each should not be secrets in a democratic society. Most people know something about the manufacture of the automobile, how the motion picture is made and how the telephone communication system operates, but how well does the average person know what goes on inside his neighborhood school?

Industrial arts in its scope encompasses a great area of subject matter for general education common to all understanding. But how much does the average citizen know about what is being taught and how it is being taught in the school of his community? Actually the shop does have many things which are of public interest. Not only do many school administrators need information regarding course content
change and method development in all the various subject areas, but likewise the general public if they are to be intelligently informed about their schools. A representative portion of each and every community can be witness to the fact of an ever changing world and should be aware of the inevitable process which requires curriculum change from year to year.

In communicating with the public and with each other, school men like other public servants do make reports. David Snedden, when Commissioner of Education in Massachusetts explained his viewpoint in regard to school reports in the following manner.

The school or educational report is to be regarded primarily as a communication to the public - to a public which reads newspapers, which has a fair interest in education, which develops here and there careful critics, destructive or constructive, and in the last analysis is interested in both efficiency and economy in education. (4:977) ¹

In addition, Snedden believed that school reports could be addressed to others than the public and still be designed for public consumption. For example, addressed to sociological students; to educational experts; to the teaching force or to the principal or superintendent. The writer has chosen to address the industrial arts report which he considers at this time, to the principal. Usually the principal is next highest in the chain of school organization to the shop

¹ This method of documenting is used throughout. The first number refers to the book or reference of the numbered bibliography. Page 69, the second number refers to the page in that reference.
teacher, so it is titled as such with the purpose of going through channels on its way to the public. The superintendent of the school must endorse the report to the public.

This report if published, as it should be, is primarily a communication to the public. It should aim to do three things.

1. Accurately describe certain situations in the industrial arts shop.

2. Point the way and assist in the making of correct inferences.

3. Reach a representative portion of the public and keep that public informed as to the significant things in industrial arts development and need.

**Definition.**

With these aims in mind it is necessary to define or present specifications for a comprehensive report from the shop teacher to the principal, which will be a means of accomplishing the above purposes. The annual shop report is:

1. A description and record of what has been accomplished in the shop.

2. A description of how that which is accomplished, was accomplished.

3. An appraisal of student progress with evidence to support claims of achievement.


A comprehensive department report represents the codification and organization of information on a specific department or shop.
Purposes.

The specific purpose of this study is to present a plan for an annual shop report to the principal, for instructors to consider as a guide for making it a public relations endeavor along some very specific lines. In general, the aim for the report and its preparation is to improve the industrial arts program in a school by means of the professional growth of the instructor undertaking the task, and by informing the community well enough to visualize the needs for the perpetuation of a live and adequate program in every respect. The professional growth will develop as a result of effective stewardship by the instructor in improving conditions under which boys and girls receive instruction in industrial arts. Specifically the writer has set up three definite purposes which this plan is to accomplish.

1. To make a complete inventory of all aspects of the shop program in the school.

2. To arrange the inventory with regard to its most appropriate sequence in the form of an annual report to the principal.

3. To present a description of the method used in teaching shop courses.

Considerations which the writer has selected as basic in this study are developed in the chapters that follow. They are, the component parts of a report of this kind, the procedure for collecting data, and the writing and organizing of the report and the finishing and exhibiting of the completed report.
The purposes for organizing this material imply a number of things which affect the interest of the writer. But because of a lack of available data they cannot be considered in this study. These elements of further concern cannot be presented until the purposes for organizing this material are made clear.

The purposes for organizing this material lie clearly in the need for a report of this kind. This need is established by certain elements of knowledge and information which are lacking in most high school departments. Every teacher in a new situation quickly realizes that there is very little knowledge to which he can refer in order to find what has gone on before in the teaching position he is appointed to fill. In the case of industrial arts these apparent needs for an annual report are:

1. The need for an historical record of each shop and its accomplishments.

2. The need of a means of self-stimulation on the part of all instructors.

3. The need for a complete record of the past teaching experience of an instructor. This is valuable to him in seeking new appointments.

4. The need for a means of improving the industrial arts program by planning ahead, annually.

5. The need for a means of informing school administrators in a way which will increase their understanding of industrial arts and its possibilities in general education.

What this report and the making of it will do generally, can at this time only be surmised. The writer has found
the experience most helpful to him. Further elements which affect the interest of the writer specifically are:

1. What will the making of such a report do and what can it do by way of stimulating professional growth in the person making the report?

2. What will the completed report do by way of improving the shop environment and its activities?

3. What will the report do for administrators by way of educating them and increasing their understanding of industrial arts?

The work involved for the teacher in making a report to the principal requires a form of self-appraisal, a re-examining of his shop conditions and facilities, a re-examination of his teaching methods and his philosophy of education. The progress which his students have made normally goes along with this self-examination. The real worth of the report is both in the making of it, and in its utility after it has been completed. In any event, like in other undertakings, reward will be in proportion to the skill and the amount of effort put forth.

At present little can be claimed by way of specific uses for an annual report of industrial arts to the principal. The following possibilities are offered.

1. The finished report should define and record shop attendance, enrollment and achievement year by year.

2. The finished report should record the philosophy of the school each year, noting changes.

3. The finished report should state purposes, objectives and aims for each coming year.
4. The finished report may serve as a yearly appraisal of the class achievement and the shop plan showing any physical limitations there.

5. The finished report should serve as an instrument for educating the administrators and the parents.

6. The finished report should carry specifications for any physical improvements and supplies to be requisitioned.

7. The finished report should provide a starting basis for a new instructor in the shop.

8. These finished reports may be instruments for comparative evaluation of various shops within a state if all instructors were to report in this manner.

Emphasis in regard to in-service training of teachers is made here for the service that the making of this report can perform by way of increasing professional growth of the teacher who attacks this as a problem. Secondly, comes the utility it may serve when it is completed. It is believed that the supervisors and administrators will see the utility of the report once any number of them are in evidence.

There are certain basic assumptions for a study of this kind. Among those which the writer has considered five at the last analysis seem significant. These are:

1. Industrial arts involves both industry and art; it is a result of the intimate association and application of the tools, skills, methods and materials of industry and art.

2. Fundamentally, industrial arts in general education is no different from other kinds of subject matter because of the sameness in the ends to be achieved.

3. The confusion between industrial arts and vocational education today frequently is a chief
obstruction in the path of democratic school progress in general education.

4. The teacher training institutions must accept a large share of responsibility for reinterpreting the philosophical and methodological changes in the area of industrial arts from year to year.

5. To a very large extent the effectiveness of instructors must be measured by themselves in action in order to stimulate efforts in the direction of real improvement. Hence the responsibility of teachers in service to share with teacher training institutions, the responsibility of reinterpreting philosophy and method.

This study is limited in its development of a suggested plan of making an annual report to the principal by designing the plan for a teacher of industrial arts in an average junior or senior high shop. As indicated in the title, this is "A" plan for an annual report to the principal and in no way is it to be considered "THE" plan.

This plan is to reverse the usual procedure of merely stipulating a form plan for a report. It places first emphasis on the self-improvement of the teacher through the application of a method of intelligence to a specific problem.

As has already been suggested, the writer does visualize a service of self-education and improvement through growth, springing from the making of this report. In order for an instructor to improve himself and his program he will first have to make an appraisal of himself and his methods. Secondly, at the outset of this self-appraisal he will need to re-examine his own philosophy of industrial arts and of
education in general. In order to determine if his philosophy of education corresponds with that of the school in which he is teaching, it will be necessary for him to examine the philosophy of the school, then in case of serious divergence take steps to develop a philosophy or philosophies which will give consideration and emphasis to the needs, interests, and welfare of the students and/or society.

As a result of past experience the writer feels that an instructor will find the task of compiling the report a means and an instrument of constructive self-criticism. Too often we tend to be too critical of others and seldom do we critically examine ourselves.

The next chapter presents the component elements embodied in the report.
CHAPTER 2
CONSTITUENTS OF THE REPORT

This chapter will provide information concerning significant factors to be considered in making an annual industrial arts shop report. The component parts of what may be compared to a bill of material necessary for building a house. If this report is to be an instrument for public relations, the instructor for whom this plan is a guide must ask himself, what do I want to include in this report as information for the layman in my community as well as for the school administrator? By asking the instructor to be specific with respect to accomplishments he has achieved automatically, requires a specific statement of what he has learned and the growth he has made. This involves thinking through the problem and the answer he would give in making an intelligible report.

The method used to determine the component parts of the report is a series of questions. This is done for two reasons. First, it assists the reader in avoiding the hazard of making improper inferences from merely reading a list of component parts. Second, it provides a clearer understanding of that which the writer intends for the instructor to include in the finished report.

The questions may be thought of as coming from the public. The questions themselves have been designed with
the above intent in mind, but they have in no way been solicited from the public. Is it not intelligent to assume that because of a lack of professional understanding the public does not know what it wants in the way of information? It is believed that good public relations lie in informing the public of what they need to know, and not what they may want to know. Also it is proposed that the report provide information to the school administrators as well as to the public. With this control from those connected officially with education, the industrial arts teachers can not only provide information which the public and the school administrators want to know but also that which, in his judgement, they need to know for their fullest understanding of industrial arts and its methods.

Presenting the components in the form of questions directs attention to specifics and should suggest to the instructor that there may be other essential components which pertain to his particular situation. All the important elements should be presented in a well rounded report.

1. Why has this report been prepared and for whom is it intended?
2. What purposes does general education have today?
3. What are the purposes of the school in the community?
4. What are the purposes of the shop in the school?
5. What are the purposes of the teacher in the shop?
6. What is the status of the shop environment?
7. Why is it the way it is?
8. What was the course of study in the past year?
9. What teaching methods are used?
10. Why are these methods used?
11. What is the student enrollment this year?
12. Why is it not different than it is?
13. What is the night school or adult education enrollment this year?
14. Why is it not different than it is?
15. What are the general accomplishments in the shop?
16. How does the laboratory plan serve the shop activities?
17. What are the student academic achievements in the shop?
18. What evidences are there to show and substantiate all achievement and development of the students?
19. What attitudes and appreciations have students developed?
20. What habits were developed?
21. Has clear thinking on the part of each student been improved? What devices were used to accomplish this end?
22. How have social-sensitivity and student beliefs been developed and improved.
23. Why has the instructor emphasized this development?
24. What evidence is there of this development and which in his opinion have been achieved?
25. What characteristic behavior patterns have been developed?

26. What are the proposed developments for a new course of study?

27. What seem to be the differences between school policy and shop operation?

28. What proposals are made for laboratory improvement for next year?

29. What new equipment is needed to replace worn out property?

30. What are the justifications for all suggested changes.

31. What are the specifications needed for the new physical improvements?

32. What are the specifications need for the new equipment?

33. What materials, and supplies are needed for next year?

34. Has each expenditure been justified in terms of the philosophy as stated?

This list is considered essential for a comprehensive industrial arts report. As the situation to which these questions may be applied is viewed, it will be seen that some are of a great deal more importance than others. Thus the instructor must judge for himself. His reports may place more emphasis on one point than on others.

Like building a house, care must be taken in its planning so that decoration which does not serve a purpose in
the over-all design does not detract from the final result. Therefore, only those things which have significance for the immediate situation may be all that are necessary in making the report.

In the next chapter will be found the procedure for arriving at the answers to the questions which have been presented here. In most cases an analysis is necessary, to develop a course of study, to improve a laboratory plan, to segregate teaching methods and to arrive at a statement of philosophy. Perspective will be found an essential. Measuring student progress is a study in itself.
CHAPTER 3
PROCEDURE OF SECURING DATA

The purpose of this chapter is to present a plan of procedure for the industrial arts instructor to use in gathering data for writing an annual report to the principal. A suggested plan of procedure is presented for the reader's consideration. The plan of procedure is divided into six parts or steps and designated as tasks in preparing to write a report. The tasks are so arranged that each contributes in some way toward the fullest realization of those steps that immediately follow in their order. Parts of the plan of procedure are as follows:

1. Developing a philosophy of education.
2. Developing a course of study.
3. Analyzing the laboratory plan.
4. Tabulating the student enrollment.
5. Analyzing the teaching methods.

Primary to the development of a course of study is a philosophy; primary to a laboratory plan is a course of study; primary to allocation of student enrollment is a laboratory plan; and so the procedure progresses to the evaluation program which is the only task which is continuous throughout the year. Each step will be discussed separately and in the order named.
The Development of a Philosophy.

The problem of analyzing the philosophy of the school, the philosophy of the shop and the philosophy of the instructor himself involves the application of several criteria for developing a school philosophy. Dr. Harold B. Alberty in "A Plan for Developing a Philosophy of Education for the High School," suggests the following:

1. Examination of the existing philosophy in relation to practice.
2. Organizing the teaching staff for the development or revision of the school’s philosophy.
3. Determination of the scope of the study and the basic principles involved.
4. Studying literature bearing upon the current conceptions of a philosophy for the secondary school.
5. Studying the local situation.
6. Formulating a preliminary point of view.
7. Formulating a final statement. (1:199-210)

In analyzing the philosophy of the school, a wise instructor would attempt to determine if the philosophy of the school had been developed by this method of one similar. In any event it should be a product of the teaching staff of the school and not the result of efforts on the part of the principal alone to describe what is or what he thinks should be done. If the instructor finds that this plan of development or something similar has been used in developing the philosophy of the school, he is justified in feeling quite certain that it has been developed in a professional manner and that he can be justified in using it.
Should no clear or adequate statement of the school's philosophy exist he should in some way promote an undertaking which will result in the desired effect. This effort is, and will be much more acceptable to him in the final outcome than if he should attempt independently to formulate a statement of the school's philosophy.

The Purpose of the School Program.

THE FUNCTION OF THE SCHOOL IS TO PROMOTE THE CONTINUOUS RECONSTRUCTION, IMPROVEMENT, AND ENRICHMENT OF INDIVIDUAL AND GROUP LIVING.

To this end the school, among its manifold responsibilities, should seek to provide, in keeping with the maturity levels of pupils, a program that fosters the following:

I. The emergence of a personal point of view or philosophy of life compatible with the following purposes:

II. The ability to deal intelligently with problems of individual and social import. This implies cultivating

1. Curiosity about and sensitivity to these major problems and significant values of living.

2. The disposition and tendency to make critically considered choice among values and conflicting points of view with reference to one's philosophy of life.

3. The tendency and ability to formulate and carry into effect plans of action consistent with such choice.

III. The discovery and cultivation of a wide variety of personal interests and the direction of these into channels which promise most for the pupil's evolving life program and for the society of which he is a part.

---

2 Distributed by Industrial Arts Department, Ohio State University, Columbus.
IV. The control of such resources (concepts, information, techniques, habits, and skills) as are adequate to the achievement of purposes.

V. The conservation and promotion of optimal physical and emotional well-being.

VI. The judicious exercise of adult guidance and control which protects and promotes the optimal development of the child to the end that reasoned self-direction may increasingly emerge.

The production of a statement of philosophy for the shop and one for the instructor himself will involve much the same process as in formulating a statement of philosophy for the school. Instead of staff committees the instructor of industrial arts will have to resort to the method of intelligence in developing and making his own philosophy correspond with the philosophy of the shop and with that of the school, assuming these have been developed democratically.

Intelligible construction and foresight in the making of such statement of philosophy will determine, to a large degree, the interest developed in the report by the reading public. This interest must be of such a nature that they will want to read further in the report and find out how the instructor has carried out the aims and objectives established in his statements of philosophy.

Congruous with formulating a philosophy for a high school, seven steps similar to those in Dr. Albery's plan can be set up for formulating educational philosophy of the shop and for the teacher. These seven steps may be stated as follows:

1. Examination of the existing philosophy of the shop and how the teachers teach.
2. Organizing the teaching methods in the shop and the ideals and values of the teacher for the development and revision of a philosophy of the shop and for the teacher.

3. Determination of the scope and basic philosophic principles of the shop and of the instructor's teaching methods in the shop.

4. Studying literature bearing upon the current conceptions of industrial arts in the secondary school.

5. Studying the local situation in view of applying a correspondent philosophy for the shop and for the teacher.

6. Formulating a preliminary point of view.

7. Formulating a final statement of philosophy for the shop and for the instructor.

It must be kept in mind that steps for doing two things are included in this list, and that the teacher can use the same steps for arriving at his own philosophy and for arriving at the philosophy of the shop. This can be done separately or simultaneously, which ever seems most fruitful for the instructor.

Developing a Course of Study.

A curriculum and a course of study are not the same thing. Some important issues are being obscured by the current tendency to confuse them. Bonser in discussing what the curriculum must offer to meet the aims of education states:

The curriculum should be based on fundamental needs of: (1) Preserving health; (2) Doing one's work well; (3) Cooperative effectiveness; and (4) Use of spare time. (2:95)
Curriculum means what pupils need to learn to achieve optimal all-round development and growth, course of study, on the other hand, refers to a particular printed or typewritten document which is intended to guide the teacher in his attempts at aiding students in the learning process. Making a curriculum is a task for which educational theory, educational philosophy, educational sociology and educational psychology must lay the foundation. Making a course of study on the other hand, is largely a problem of English composition.

Failure to recognize this has greatly retarded the development of the art of course-of-study-making. It is as yet an art with almost no recognized standards. The textbooks in each subject continue to be the guide which teachers actually follow. This is not the proper function of a textbook. It is usually written too far away from the scene of action. Perhaps this is not quite so true of books now being used as guides in the selection of content for courses in industrial arts.

Nevertheless, a course of study for industrial arts should find specific consideration for each of the following five points essential to course of study construction.

1. There must be a sufficient statement of the aims of the school and the essential nature of its work to insure a common point of view.

2. Objectives, moreover, must be sufficiently definite that they can be applied as standards
and tests of attainment.

3. The chief function of the course of study is to show how subject matter is to be applied to the satisfaction of the real needs of the student. This means that suggestions as to method must have an honored place. The principles of method should have concrete illustrations.

4. There is also the feature of materials and sources for both the teacher and the student. This must be selective. It must have been evaluated.

5. There is the question of perspective and relationship. The curriculum of the school should be displayed not only in a course by subjects but also in terms of "life units" and group activities so as to show how in fact, various kinds of subject matter are necessarily brought to bear in attaining almost all human ends.

Two issues which the competent construction of course of study never confuses are, namely, what should be done in the shop and how to get it done. No implications toward the discussion of what students should be learning have been attempted in this study. That is a curriculum problem.

It is assumed that the course of study will be taken seriously and will be prepared with all possible skill so that it will be real expressions of an educational program. Before adoption, courses of study should be studied and interpreted with extreme care by supervisors and teachers
together and restudied and revised as occasion may necessi-
tate. Because in the final analysis, courses of study are
means to ends which the shop program is assured to accomplish.
These accomplishments should be an outstanding feature of
the final report.

The writer maintains that the course of study should
embody clear statements of purposes both general and specific,
present standards by which to judge progress, indicate the
experiences the students are to have, by what means they
are to be presented or offered. Sources of materials should
be presented and reference made to authorities. He also
believes that the course of study should help the teachers
to decide upon the proper emphasis to be given different
elements of the course and to establish natural and helpful
relationships between students and teachers. Generally
the teacher must make his own course of study.

Perhaps it is not too much to hope that courses of
study conceived on these lines may do a good deal toward
improving the teacher's own personal and professional growth.
Constructing a course of study presents a challenge to the
instructor and should inspire him to renewed zeal for his
task because it shows him clearly what that task is and
should offer suggestions as to how it may be accomplished
most effectively.

Finally, a course of study must be looked upon as a
growing proposition that will continue to change as long
as the human race continues to grow.

**Analysis of the Laboratory Plan.**

In making an analysis of the laboratory plan as it exists, the instructor may find two things entering his mind at the same time. The plan as it is, and the plan as he would like to see it. In analyzing the existing plan he must, for the time being, dismiss the image of what he would like to see, and only report on what he finds in the present plan. To capture a true picture of things as they are one must erase all hopes for things as he would like them. Therefore, the instructor must start with an unbiased attitude toward the things as they exist.

Laboratory size and shape can be shown by means of a scale drawing of a floor plan. Laboratory arrangement can be pictured in this plan, labeling the working areas and the arrangement of the equipment and machinery. Auxiliary facilities can be described along with the architectural considerations, but each should be discussed in a separate paragraph. Entrances, bulletin boards, utilities, natural light, artificial light, paint, power control, and ventilation should be discussed in whatever detail the situation seems to demand. Floors, wall, ceiling and partition treatment may receive comment at this time or they may be omitted depending on how the instructor will deal with them as they are considered for improvement in a later part of the report.

Because of the general ability of people to read floor
plans, it is suggested that graphic illustrations be used as far as possible to describe the plan of the shop. Consideration of the type of duplication available must be kept in mind while making the drawing in order that the form of graphic representation applicable to the situation will be used.

Owing to the usual drawing ability on the part of most industrial arts instructors, together with their knowledge of how to represent existing features in a floor plan, it is believed that further description of the laboratory plan of analysis is not necessary. In all cases a plan drawing will serve the purpose of most instructors in making their report.

**Characteristic Data Which Should Appear on the Plan**

- Sq. Ft. Floor Space (overall, minus partitions).
- Sq. Ft. Per Student Working Stations.
- Sq. Ft. Per Instructor (area specifically set aside for the instructor).
- Avg. Ft. Candle Light - Daylight at Bench Height.
- Avg. Ft. Candle Light - Artificial Light at Bench Height.
- No. of Students Working Stations Per Area.
- No. of Total Students Working Stations.
- No. of Existing Locker Space Inside the Shop.

**Tabulating Student Enrollment.**

The problem of gathering data on student enrollment is
without question the easiest for an instructor. All that he finds necessary is to refer to his student record book and total the list for the various course classes or sections. Presenting these totals is the usual way of picturing the enrollment, but is by no means the only significant data that can come from course enrollment figures.

An instructor who is himself desirous of knowing more facts in regard to shop load and teacher load can and will develop some statistical evidence showing what is happening. What may be shown by statistical treatment of enrollments may not be desirable in each situation but each element may in turn bear facts of varying significance of which the instructor and the principal may not be aware, but should know. These significant points may have never been considered by the principal and several of these may be items of information which the public should know. The points on which an instructor may want to present statistical evidence are:

The number of students in each course.
The number of girls in each course.
The number of students in the class from each grade level. (9th, 10th, etc.)
The average shop load per week.
The average class load per week.
The average course load per week.
The average shop load per hour per week.
The average shop load per day per week.
The average cost to students of materials by grade.
The average cost of materials in the different activities.

The shop load is the number of students enrolled in shop Courses. The daily load may be greater some days than it is others.
Course load is the number of students enrolled in a specific course, courses may be listed separately. Class load is the number of students from each class. The tenth grade may have more students in shop courses than any of the upper classes. Should there be more than one instructor in the shop, teacher load may be significant information for the principal and the superintendent to realize.

Enrollment statistics are usually not interesting, but are of vital significance in showing how many students circulate through the shop courses each week. Statistics can easily be presented to misrepresent true facts. This is not an honorable practice but it is known to have been done. The instructor should determine in some way what he wants the public and the superintendent to know about his shop enrollment, and then present his evidence in a manner that will best illustrate overcrowded conditions or the lack in load in some classes. Enrollment statistics may indicate weaknesses and/or strong points in a program, and frequently is evidence of the attitude of students in regard to shop work. In some cases it is an indicator of the attitude of the administration. Enrollment data are sometimes a very significant factor in convincing administrative critics of the worthwhileness of a program.

Analysis of Teaching Methods.

In the teaching of industrial arts subject matter many different approaches may be made by the teacher in an attempt to attain results. Some instructors have applied the same
method of teaching in all areas while more often a combination of two or more are used in each area. Concurrently, a teacher may emphasize one approach in one area, let us say metals, and emphasize another approach in teaching woodworking or mechanical drawing. Whether one approach is better or more effective in one situation or not, is not the object of the discussion at this time. A means of identifying the various methods of instruction must be used by the teacher so that he can describe specific application to the emphasis given in each area of the industrial arts shop. Characteristic areas of a "Laboratory of Industries" are:

- Automotives
- Cold Metals
- Bookbinding
- Hot Metals
- Ceramics
- Photography
- Drawing and Planning
- Printing
- Electricity
- Textiles and Leather Craft
- Graphic Arts
- Woodworking

There are many different teaching methods used by teachers of industrial arts. Fifteen of those most commonly used are:

1. **The subject approach** is the method of teaching industrial arts subject matter with emphasis on the subject as provided in books and with little regard for any of the significant aspects of student growth and development.

2. **The skill and technique approach** is the method of
teaching industrial arts subject matter with emphasis on skill and technique and little regard for significant knowledge appropriate to the problems involving the application of skill and technique. Furthermore the psychological and sociological values of skills are not even recognized much less emphasized.

3. The orientation approach is the method of teaching industrial arts subject matter with emphasis on the general relation of tools, processes, and materials, and a regard for significant knowledge appropriate to the problems at hand. In this method emphasis is, or should be, on helping the student to understand significant things about the environment in which he lives and the work of the world.

4. The student development approach is the method of teaching industrial arts subject matter with emphasis on the personal development of the individual student and only relative regard for the knowledge of tool processes and materials in the problem at hand.

5. The vocational approach is the method of teaching industrial arts subject matter with emphasis on the vocational aspect of skillful tool practice together with a guidance function. When this method is used, significant knowledge appropriate to the
problem at hand often is neglected, for example, the problems of labor and capital.

6. The material knowledge approach is the method of teaching industrial arts subject matter with emphasis on knowledge of materials involved in the processes and with little regard for significant knowledge of the processes appropriate to the problem at hand.

7. The tool knowledge approach is the method of teaching industrial arts subject matter with emphasis on the knowledge of tools involved in the process and little regard for significant factors concerning materials appropriate to the problem at hand.

8. The industrial techniques approach is the method of teaching industrial arts subject matter with emphasis on the techniques of industry involved in the process with little regard for any of the other significant aspects appropriate to the concern of the boy and his problems.

9. The correlation and integration approach is the method of teaching industrial arts subject matter with emphasis on correlation and integration of its problems with other subjects in the school and little regard for tool skills and processes. In some instances so little attention is given to the latter that it becomes practically a disregard of the factors mentioned.
10. **The practical arts approach** is the method of teaching industrial arts subject matter with emphasis on creative and artistic design and little regard for tool processes, knowledge and skills appropriate to the problem at hand.

11. **The household or practical homemaking approach** is the method of teaching industrial arts subject matter with emphasis on making the boy a household repairman with little attention given to mastery of tool processes, knowledge and skills appropriate to the problem involved.

12. **The engineering college preparatory approach** is the method of teaching industrial arts subject matter with emphasis on engineering college preparatory practices and little regard for the tool processes, knowledge and skills appropriate to the interests of the boy and his problems.

13. **The science approach** is the method of teaching industrial arts subject matter with emphasis on the scientific aspects of the process and little regard for the tool processes, knowledge and skills appropriate to the problem involved.

14. **The consumer approach** is the method of teaching industrial arts subject matter with emphasis on the consumer knowledge and utility of the product and having little regard for the tool processes, knowledge and skills appropriate to the making of the product.
15. The social significance approach is the method of teaching industrial arts subject matter with emphasis on the historic and social significance of the problem, and having little regard for the developmental process, the mechanics of tool processes and the knowledge fundamental to the problems of modern industrial production.

Seldom is it thought good teaching practice to use any one of these approaches to the exclusion of all others in dealing with any specific form of subject matter. The orientation approach, however does come closest to giving balanced emphasis in variety of aspects than does any of the other teaching methods discussed. In making a careful analysis of various teachers and their methods, one would find that emphasis in regard to his method will fall quite largely into one of these approaches. It is believed that the greater the number of approaches that a teacher makes in teaching any one phase of the subject matter, the better the job of teaching he is doing from the approach of general education.

In using a variety of methods the teacher is likely to achieve balance in the emphasis he gives to the various aspects of the work and consequently is more likely to serve the interests, needs and wants of his students.

Evaluating Student Achievement

The purpose of evaluating industrial arts students is generally thought of as a means of determining if students
have learned what they were taught. Actually there is more than this one purpose. In order that the broadest concept of evaluation be understood, there are three purposes for evaluating students all of which lie outside the academic achievement of the student as determined and indicated by the grades given by the teacher.

The first purpose of evaluating the student in the shop is to provide opportunity for each student to appraise his own progress. Appraisal of the student should not fall solely on the teacher. The student must learn that he himself must evaluate his own progress in relation to others in his class, and his own progress as a part of a class or group. He must appraise his own progress in terms of, and in relation to his own standards, as well as those standards of the class of which he is a part.

A second purpose, is to provide the teacher a more thorough understanding of the student. This understanding must not be only the understanding of the academic acuity of the student, but must extend itself into the personal, social and emotional makeup of each student in order that the teacher can better present his instruction, set up student experiences, and more effectively motivate, guide and direct his students. It is often said that a teacher tests his students to determine if his teaching is good, rather than testing to determine if his students have learned well, what he has taught them.

The third purpose for evaluating students is that of
establishing a basis for modifying offerings and also modifying the course of study. As a result of examining a student the teacher should get a clear idea of what the student needs. If the instructor is certain that the fault does not lie in his instruction, or in the way in which the student was taught, he may decide that courses need modifying. He may ask himself, as have Brunner and Others done in What Our Schools Are Teaching:

Do the evaluating procedures contribute to a realization of the extent to which the accepted educational objectives are being realized? Is the process of evaluation conceived of as an integral part of the learning experience? (3:213)

Of course instructors may have numerous specific purposes for evaluating their students. Even so they must give consideration to purposes of a more general nature.

The evaluation processes in industrial arts should be of sufficient variety to provide for appraisal of the program and growth of the student in a number of respects. The variety must provide for a certain amount of student self-evaluation. The effectiveness of any program of appraisal can only be measured in individual appraisal of the student's ability to adjust to various situations.

A second reason for a variety of evaluation measures is to provide the teacher an opportunity to make various appraisals of his students when a variety of teaching methods are employed. No one or two techniques of evaluation will give results which are as revealing as those of a wide variety.
Thirdly the variety of evaluation techniques must, and can provide for adequate appraisal of individual differences. No one form of testing will reveal adequate measurement for the variety of individual differences found among students. All students think differently, behave differently, and must be provided a chance to exhibit and self-evaluate all of their abilities. This holds also for the teacher's interpretation.

In order for evaluation to be valid and reliable the instruments used to secure data must produce valid and reliable results. Tests must measure the thing that they are designed to measure. Furthermore, they must measure each variable accurately. Tyler says in Constructing Achievement Tests:

The criterion of a valid test should be the reaction of students in a variety of situations appropriate to the objectives of the subject. (9:61)

Tests should approximate the natural learning situation. Student cooperation and understanding of a need for some sort of continuous evaluation will assist in producing valid results. All evaluation processes should be in relation to all other aspects of behavior in the shop.

Opportunity for personality growth and development are great in the industrial arts shop, and while no greater responsibility for fostering such growth exists than in other departments, the fact remains that quite often greater consideration is given to the personal and individual develop-
ment of the student than in other courses. The whole matter of personality development of the individual is not merely a matter of academic achievement. Academic learning has for some time been the most respected area of growth in our schools. Academic learning has been thought of as mental development; being carried on quite largely to provide basic understandings, information, generalizations, and concepts in the various subjects in which students are taught.

Industrial arts does emphasize development of skills and abilities. But skill and ability are not synonymous. Ability represents the capacity to learn and skill achievement or achievement of skills and information are the learnings acquired in the shop. Anything that the individual has learned to do with ease and precision is a skill, either a physical or a mental performance. Ability is the actual power present in an individual to carry to completion any given act or to make the necessary adjustments successfully. Provision must be made for appraisal of skills and abilities as they develop.

Student growth, more currently thought of as progress, should include physical, emotional, social as well as mental growths. Personal traits, such as ambition, integrity, and willingness and readiness to accept and assume responsibilities are characteristics which must be developed. Aiding students to develop desirable personal social traits is a responsibility of all teachers and especially teachers
of industrial arts. In view of the importance of personality traits in life, provision must be made for the appraisal of desirable personality traits to determine if progress is being made in this regard. Likewise, social traits such as cooperation, adaptiveness, and social sensitivity must receive direction and appraisal to determine the extent to which desirable traits have been established in the students.

Intellectual traits, such as open-mindedness, clear habits of thinking, insight, and general mental stability; emotional traits, which foster emotional stability such as love, friendliness, sympathy, and good will; appreciation, attitudes and ideals in the aesthetic, social and physical sciences; desirable interest in literature, in social studies, in science, and in the recreational world, all attain growth in the shop student and provision must be made for appraisal of this growth.

Evaluation of the various behavior traits must be continuous, and taken from the natural learning situations that go on from day to day. Behavior can be recorded by keeping anecdotal records on many of the observed traits of students. Measuring other than academic learning requires considerable and ingenious planning to obtain the desired data. Boys and girls in the shop reveal so much of this growth in overt action. Consequently reasonably accurate measures can be drawn from the observed reactions of the students.

The interpretation of evaluative materials which have
been collected in the shop is by far the most important factor in compiling data to show the result achieved. Basic to good interpretation on the part of the teacher are some rather definite suggestions which should be made for interpreting all evaluative data. Primarily, one must have a good understanding of human beings, be able to interpret behavior and recognize limiting or conditioning factors.

The normal individual must be thought of as one who is not average in every phase of growth, but who may deviate from the average in some aspects of development. Some provision should be made for drawing all evaluative data into an "integrated portrait" (7:220) of the individual, instead of using separate and minute data to indicate specific growth.

Care must be taken while interpreting data that they are used correspondent with the purpose of evaluation as indicated in the school's statement of purposes.

The student should grow in his ability to interpret with increasing accuracy the raw data upon the basis of which evaluation is made and this is not only in the knowledge of his own personal development but in terms of his social contributions to his group.

With teacher interpretation and student interpretation of evaluative data it can be seen that evaluation and interpretation is a continuum. The need for continuous function of both measures is necessary because of ever-changing educational goals, and because of everchanging
industrial arts objectives. The job is enduring but of greatest satisfaction to the shop teacher who in some way measures what he sees developing from day to day in every individual student.

The next chapter will describe a plan for writing and organizing the report. It should provide a culmination for all that is gathered throughout the year and reflect a coherent overview of accomplishments, present status, and needs.
CHAPTER 4
THE PLAN FOR WRITING AND ORGANIZING THE REPORT

This chapter is to provide a plan for the instructor in writing and organizing the report. It will follow quite closely a format which will be presented in summing up the discussion and directions given to the teacher. The writer has chosen for the purpose of clarity to write as though he were directing a shop instructor who had made the necessary preparation, having collected the necessary data, and who is about to undertake the preparation of his first draft on the report.

The task is divided into five divisions each giving emphasis to certain problems of organization and content. These divisions in the order of their consideration are:

1. The arrangement and organization of philosophy pertaining to the school, the shop and the instructor.

2. The arrangement and organization used in describing the present status of the shop and the shop activities.

3. The arrangement and the organization of evidences of achievement in the shop during the year.

4. The presentation of the proposed developments in the course of study, and the shop plan for the coming year.

5. The arrangement and organization of an appendix to the report. This should include requisitions with specifications recommended for needed improvements and additions.
This plan may not meet with approval of all instructors confronted with the problem of making an annual report and the writer again wishes to emphasize that it is intended in no way to be the approved or only solution to the problem of making a report of this kind. The arrangement and order of the material within the above suggested divisions or the divisions themselves as suggested here may not seem logical for all situations. However, the writer believes that most of the items presented are essential in making a comprehensive and complete report of achievements, in presenting proposals for improvements and the securing of needed supplies.

In visualizing the utility of the report after it has been completed, the instructor must constantly keep in mind that fact that he is writing to the general public. He should make his statements in a manner readily understood by the layman in his community. He should be clear and specific with points that are not generally understood by members of the community who are not connected professionally with education. The teacher preparing a report of this kind should feel it a venture in public relations for industrial arts. It may be his first attempt at a thing of this kind. Nevertheless, self-education goes on with any new experience and "nothing ventured is nothing gained". Hence, should he find that it produces desirable results it probably will not be his last attempt.

The instructions which follow are given in a direct
manner, and if the reader will but imagine himself as a shop teacher he will perhaps realize the value of the approach taken.

Philosophy.

The arrangement and organization of the statements of philosophy pertaining to the school, the shop and the instructor should logically appear in that order. With this system a reader, even though he does not understand a great deal of philosophy can be brought to understand the purposes and/or objectives of the school.

A fitting way of opening, and of introducing a reader to this matter of philosophy is to present a general statement of what general education is aiming to do for young people in the secondary schools of the nation. An excellent opportunity to quote a person widely known by the public as a leader, an educator or statesman presents itself. It makes little difference which widely known person is quoted as long as what he has said or written is worth quoting at the beginning of the report.

Immediately then turn the reader's attention to the philosophy of the school in which the shop is located. The statement of the objectives, the purposes or aims of the school should appear in the form of a concise statement or group of statements, not too long or difficult for a lay person to understand.

Secondly, the philosophy of industrial arts in the
shop should appear in the form of a concise statement or statements. This should not be long or wordy but should clearly express the potentialities of the school laboratory in a manner that will leave the reader feel that the statement is important. This should lead him to feel that what the shop is doing or can do is or will make a significant contribution to the education of the youth of the community.

It should be clearly shown that the objectives of industrial arts do contribute to the school purposes and that purposes of the school and those of industrial arts mutually support each other.

Thirdly, in this division should appear your statement of objectives for teaching industrial arts in your shop. The objectives that you have must appear in concise form and clearly express your purposes in teaching the subject.

Care must be taken at this point in respect to stating something which you do not practice. If this should happen it may have undesirable effects. One, it may discredit you as a teacher and/or discredit your program. Two, it may destroy the effectiveness of the report in the minds of many whom you hope will read it. Either of these results might have an undesirable effect, and definitely would be an immediate handicap to the person making the report. A handicap that might take years to overcome.

By way of summary the philosophy of the instructor must be in keeping with that established for the shop, the philosophy of the industrial arts shop must support the
purposes of the school and the purposes of the school in turn must contribute to the "big picture" of general education.

After formulating these statements a wise instructor would compare them with those of some accredited school. This comparison should reveal whether the teacher's statements carry somewhat the same force as those of a better established authority. (see page 18) If your statements do not compare well with those of a school reputed to have an exemplary statement of purposes check further in order to determine whether what you have written is sound or whether your selection of an accredited school has been well founded.

The Present Status of the Shop Environment

In arranging and organizing the description of the present status of the shop and the shop activities one must consider a number of components all of which must receive special attention. This section of this report will give attention to five aspects of the environment, namely: the course of study, the teaching methods, the pupil enrollment, general accomplishments, and an elementary analysis of the laboratory plan. In consistent form each element will be considered separately as depicting the present status of the shop.

The course of study. This may be organized in one of two ways. First, the complete course of study for industrial
arts in its exact form can be used in the report. This may be obtained from the office of the principal. Second, and perhaps equally effective, a summary of the course of study can be presented. This latter method gives one a chance to make a usually stiff group of statements appear with more meaning and to reflect any degree of enthusiasm and sparkle that is desired.

In any case, the course of study should appear in this report. If there is none in written or printed form, then you will have to make one. There is no one quite as capable of doing this as is the instructor who has been teaching the subject. Merely outline what was accomplished during the year in each class or course. This outline will represent your course of study for the year. There are many schools which arrive at their entire curriculum content from year to year in this manner. This is not good practice because no goals have been set before hand, but oftentimes this method has few deviations from true fact than the course of study set up before the beginning of the school year. Here is a definite reason and value in employing this form of report. It will establish a course of study for your shop and set up a plan for the coming year.

Make place in the last of this section on course of study for "suggestions for next year". Suggest changes which you believe are fitting and proper. These suggestions should contribute toward achieving the aims and objectives
which have been set forth as goals for next year. If changes in objectives are necessary, then modifications will have to be made in the existing philosophy for the coming year. Examples of course of study content will be found on page 95.

By way of summarization, the following format is included. Such an outline, with local adaptations, will serve as a convenient table of contents around which the local course of study can be developed.

I. Orientation or introduction

II. Objectives for the course

III. Subject matter to be presented

a. May be stated in general outline form.

b. May be stated in a form more suited to the teacher's needs.

IV. Projects and problems to be included.

**The teaching methods.** The teaching methods used in the shop this year should reveal how the subject matter in the course of study was taught and how the pupils responded. Exactly how you accomplished several specified goals should be described in order that no incorrect inferences may be drawn from your presentation. In the description, the methods employed should show clearly, and directly, how the aims and objectives which have been set down were attained. If a direct method of teaching is used in teaching certain phases of subject matter, a direct statement should describe how the unit was developed and taught to
the students. On the other hand there are numerous habits and attitudes which are purposely developed in students by means of an indirect manner of teaching. This accomplish-
ment is as purposeful as the direct dealing with specific subject matter. Describe in detail the manner of application and use of these indirect methods if such seems advisable. Be sure that you present clearly all the significant methods you have selected to illustrate in the report.

Mastery of subject matter is not the only thing one should accomplish in teaching shop courses. Many of the intangibles, as attitudes, and habits, traits to which one should be purposefully contributing, have importance and value equal to or beyond that of the subject matter itself. These intangibles with which the teacher must be concerned are equal or greater in importance to subject matter because you are teaching individuals all of whom are developing habits, attitudes and traits which influence behavior and condition success in life more specifically than does subject matter. Habits and attitudes toward work which students develop in the shop often will have influence throughout the rest of their lives.

Describe the methods of administering certain executive details in the shop. Present a vivid picture of the pupil personnel organization and its functioning. Describe how the shop superintendent and foremen were selected. (page 109) Show that the method of selection agrees with the philosophy of education of the school. Relate how it
is necessary to conduct distribution of tools, and the values of methodology. Present a detailed picture of a typical shop class period, the care taken in clean-up, the methods of issuing materials, the use of the drawing room as a planning area, and library. If a congested condition exists in your shop and it is necessary to use the finishing room as a library, direct attention to this undesirable condition, its handicaps and disadvantages. Describe how everyone must conduct himself in order to get along with other members of the group.

The description of these activities should flow along as though it were an interesting narration of your shop environment and accomplishments.

Do not be critical in this description. Relate the facts as though you have no concern for the difficulties which are apparent in your narration of the facts. Try, if you can, to leave the impression that you are constantly trying to improve your method by applying new techniques which apparently will get results. The kind of results which will contribute to the fullest development of the students who are in your shop.

Indicate in the report the methods of instruction, examples of the work done in the various units, show examples of assignment sheets and study problems.

With the description of the pupil personnel organization present a copy of the posted duties of the various members holding positions of responsibility and authority. (page 120-121)
Somewhere in the report display any new shop forms adopted during the year. Tell why they were used and how they were used. Include a copy of the material slips and the plan of procedure forms, and any other printed material used in the shop designed to make the program more effective.

Illustrate the type of pupil personnel record used and the report sent to parents, if a special type of form was used. (page 114-115.)

Close the section with your suggestions for the coming year. Point out, if you can what practices you would elect to abandon. Formulate new ideas for undertaking new procedures next year. In this portion omit the detail. Perhaps a list of suggestions for ready reference is all that you may want to include. Be as constructive in your suggestions as possible. Show, if you can, that good practice in handling of shop classes is known and understood by the instructor. Make your knowledge appear worth possessing and that this knowledge has potentialities for improving the teaching methods employed in your shop.

**Student enrollment.** Student enrollment is largely a matter of tabulating the class roll in each course or class in the shop. A recapitulation of some sort should be presented in appropriately selected categories reflecting the true situation. (page 93.)

If classes appear too crowded in the plant, this is a problem you most certainly will want to get action on by the school board. Here is a most opportune occasion for you
to present the picture of the situation as you see it.

A table or two will illustrate concisely what you wish to get across. Data that are presented may be supplemented with a brief comment on significant conditions that exist.

Report night school enrollment in a manner comparable to that which has been done for the regular day school courses. Work done in evening classes may, in the minds of many adults, be one of the most significant enterprises of the school, and one which they will support enthusiastically.

General accomplishment. The general accomplishment in the shop this year should be thought of as the general way in which the shop activities have contributed to meeting the objectives of the school. This is not to be confused with recording pupil progress which has been discussed previously. In this section of the report certain class accomplishments should be revealed.

Class projects which have significant contribution to school objectives should receive especial attention here. Contributions to community projects have marked value in cultivating favorable public relations. The department, or the shop classes as a whole, has no doubt developed some relations with other departments in the school. Show in what way the shop has contributed to learning which went on under direction of another department. Report any assistance which has been given to other departments, science, art, dramatic arts, home economics, or mathematics.
Comment on any extracurricular activities which have profited by work done in the industrial arts shop. If practicable indicate the monetary values of these contributions. Wherever possible tie the industrial arts shop activities into all activities of other departments.

The more that can be shown in this part of the report, the more easily and thoroughly will the principal and others understand the place of industrial arts in the school. The more clearly the principal sees the values of industrial arts the better he will understand the need for any improvement you may suggest or present as needs.

Picture clearly accomplishments in adult education and night school activities. Set aside a section in your report for these items if they appear particularly significant to your community.

Make suggestions and develop a few of your ideas for improving articulation of industrial arts with other subject matter areas. Show where industrial arts can serve the entire school program and indicate the contributions the shop can make toward serving the community. Here is a good chance to get on common ground with administrators who do not understand the many significant possibilities that industrial arts has to offer a school system. Make your statements convincing, and do not include things that will detract or be impossible to develop. Be cautious; be smart. Only misfortune can befall the report and the instructor making the report if impracticable suggestions are presented.
Propose undertakings and ideas that can be met with reasonable effort on the part of any shop teacher.

**Analysis of the laboratory.** The analysis of the laboratory plan is and can be a study in itself. To assume that every teacher is capable of this job is not taking too much for granted. There should in fact be little question that one who works and teaches in a shop for the duration of a year is quite aware of space relationships and use, and of equipment well placed. An industrial arts instructor is normally assumed to be quite proficient in determining advantageous arrangement of equipment and other facilities. As an aid to inexperienced teachers they are referred to some basic considerations which have been developed by Dr. William E. Warner and Others at the Ohio State University. (see page 119-126) Proper lighting and ventilation can be judged by almost anyone.

In writing out your analysis, care must be taken to be fair in your evaluation. Everyone would like a model shop in which to teach, but that is impossible. Give credit to what you have where credit is due. One can hardly expect to have a shop area far superior to the other parts of the school plant. First, then, let it be suggested that you look around the school building and see what kind of a shop would fit into the plant as a whole. Do not expect or suggest in your report the development of anything that is clearly out of keeping with respect to the rest of the building. If this is done it will reflect discredit on your imagination
and judgment.

After a fair analysis of the laboratory has been made, consider suggestions for improvement in the coming year. In most cases, an entire remodeling of the laboratory should not be presented in this report unless the superintendent and the school board have been consulted and have expressed a desire to see major improvements made. The basic considerations for laboratory planning previously referred to should be given careful thought if a complete remodeling is approved by the school board.

Recording Student Progress.

Many schools have established methods of measuring and recording academic achievement, academic aptitude and description of behavior characteristics. The instructor of industrial arts will do well to recapitulate the record of industrial arts students and present the accomplishments of this students in comparison with average achievement in other subject areas. This is an undertaking which involves considerable time and labor. Assuming that your school is not too well organized in the respect of pupil personnel records, it will become your responsibility to develop some means of providing statistical evidence. In view of the amount of time and effort teachers of industrial arts spend in developing procedures for evaluating student progress, it would seem only reasonable that they would want to make use of data they had secured as an aid in depicting achievements of their students.
Certainly a scheme can be developed for showing aptitude, ability and behavior rating for each student. All evidence that will reflect progress toward more worthy membership in the community should be presented.

The difficulty of isolating significant results and measures in the case of each student make it impractical to specifically suggest how the report should cover this situation. However, every reasonable effort should be put forth to present a record showing pupil progress.

Achievement within the shop is not all objective in character. Conversely the subjective progress which takes place within each shop student is gaining more and more importance. The possibilities to the individual that accrue from handling, shaping and working with the tools and materials in the shop should be made clear in this section of the report. Many teachers of industrial arts are as much or more interested in what the processes in the shop do to the boy, as they are in what the boy does to the materials with which he works.

It is suggested that you in your report emphasize that "It isn't what the boy does to the wood, it's what the wood does to the boy." Present any tangible evidence which will give support to statements you have made and amplify their significance.

**Proposed Developments.**

When making suggestions for curriculum development the
aims of the course of study for next year should be a primary consideration of the teacher along with the fact that the curriculum of the school is ever in the process of changing. As the social, civilized, and democratic world moves on there must be a continuous change in order that education keep abreast with progress in other areas of human concern. It may not be entirely wrong for the school to follow the pattern set by society but it certainly is wrong to follow too far behind. Many educational philosophers believe that it is proper for our education to lead and establish social pattern. Warner, Havighurst, and Loeb under the currently popular title, *Who Shall Be Educated?*, write about the proposed educational program as follows:

It should aim to teach an approach to social problems which all American citizens can adopt and which will help them to deal with their inevitable clashes of economic interest in ways which will maintain cooperation among the various social and economic groups in the nation. \(10:159\)

If it is the school's responsibility to deal with social problems there must be places in the pattern of activities where the school must not only be abreast but ahead of society.

Some development in your community may change the needs of the youth in that community. The shop teacher, as well as all the other members of the school staff, should be aware of and recognize new needs of students as they develop from year to year.
Course of Study.

To meet changing needs, courses may be combined and new subject elements added. New equipment may become available and therefore necessitate a change in the course of study for the coming year. In developing a new course of study, determine if you can, what are the needs of the school, the community, and the students. This can be done by a survey, by testing through questioning or through opinions gathered from persons capable of determining needs.

Develop new aims and a course of study with these newly found needs in mind. Do not be too specific in your report at this place but present your goals in a manner that can and will be attained by any capable instructor like yourself in the same situation. Even though a change in instructors does not seem imminent, proposals for new developments should be presented in a manner readily understood by a less experienced person and accompanied by suggestions which will make accomplishment more feasible. State new aims in a manner which will reflect the aims and objectives of the whole school, and contribute to their achievement. Consult the principal and determine, if you can, if he is in agreement and if he will support your new plans. The plan of attack for the coming year can then be built with assurance on your part. Be as specific as possible in the organization of these new developments but still general enough to insure flexibility and save later embarrassment.
Teaching Methods.

When describing methods used in teaching shop courses the purpose of offering the various subjects in respective areas must be kept in mind. You should know if your approach to the various subjects is one which will effectively accomplish the purpose you have in presenting that phase of industrial arts. In writing the description of the methods used in your report, try to point out clearly why or how one approach is more effective than another. This is difficult but will, if proper description is given, strengthen your position as a teacher and establish you as a person who knows his business. This above all will be what many laymen will look for in the report. Critically, they will try to determine if the report is a front, a shield or an instrument provided them to cover up weakness in teaching ability. Here is where you must show clearly and exactly what you have done, what you do at the present, what you plan to do, what you know about the various methods of teaching, and finally, approaches you propose to use to accomplish the results desired.

Relation of School Operation to Shop Program.

The relation of the school's operation to the industrial arts classes during the year is a consideration that must be handled very carefully in the report. The principal is conscious of encouraging the less intelligent student to elect shop courses, often selecting courses for them. He
does it in a measure of being successful himself, and in
directing his students towards goals which they can attain.
His action may seem unfair because of the number of trouble-
some students assigned to classes in industrial arts.
Nevertheless, the role of industrial arts in general educa-
tion is to serve all students in the school from the very
intelligent to those less fortunately equipped. You must
attack the problem of misunderstood students with great
care. It is stimulating to realize that in one's subject
area there is something for the bright as well as the less
intelligent student. There is always some knowledge and
skill together with feelings of success which even students
with limited ability may take with them from the shop.
Realize if you can, that industrial arts excels all other
fields in this respect. Methods need not be altered markedly,
yet significant achievements are made by students of varying
levels of intellect.

There are a number of school policies in regard to
shop use (such as the handling of fees, scheduling of classes
etc.) that for various reasons do not seem fitting from
the viewpoint of the shop teacher. Here is a place in the
report to suggest modifications of school policy or routine
with the object of improving both service and relationship.
Do this in a constructive manner with consideration for
both sides of the problem. Thus, the suggestions you make
for improving conditions may find readier acceptance by the
principal. He may not have observed or considered that some
phases of school policy hamper the work of the shop teacher. It is suggested, therefore, that these differences be talked over before they find a place in the report. A constructive report to the principal on conflicting issues may be a positive means of ending these differences. Make your statements such that they will bring about the desired effect.

A harmonious school is one to pattern after. Avoid making destructive criticisms of the school administration. Emphasize concern for improving situations and developing harmonious and smooth working relationships among all elements of the school.

**Improving the Laboratory Plan.**

Proposals for improving the laboratory plan will automatically have to support any accepted plan and development in course of study content and change. This is the place in your report where you must justify any change, any remodeling or any addition by showing clearly that your proposals will facilitate achievement of school purposes. Organize this section of your report to match and support previous recommendations pertaining to laboratory planning. Presuming that these proposals may have already met with approval, detailed specifications and construction plans may now be drawn and included in this section of your report. (page 91.)

If you attempt to execute the proposed plans, be sure to produce something that can be used to work from. In
this way the report will find immediate use, thus adding value to the document. Every statement appearing should be purposeful and usable in defining what is desired in your proposed plan. All additions which you contemplate having made during the summer months must be carefully and clearly state so that no misunderstanding or misinterpretation will result. Supplies requested should likewise be clearly specified with desired sources indicated. Where this is done there should be no difficulty in getting exactly what you describe.

You must consider the cost of proposals you make so that it will not overburden normal expenditure. Do not plan for too much. A conservative plan carried out is worth many elaborate proposals which cannot be completed for numerous reasons. Before presenting an elaborate or pretentious plan consult the superintendent of schools. If he approves of your tentative plan the reports you make later will be enthusiastically received. Finally the plan which is formulated must not only build understanding, but should also contribute to the professional development of the instructor and build confidence in his ability to make a report that will reflect his achievements and display his vision of the future.
Appendix to the Report.

The report to the principal should be a complete unit. Thus far it has been considered as an instrument for the public and for the educative values it has for the administration. The appendix includes material pertaining to securing materials, supplies and equipment.

The appendix to the report, an added feature in which detailed specifications are prepared for a firm interested in contracting to remodel the laboratory or build an addition to the plant, or for a firm interested in delivering shop equipment and materials. The writer suggests that separate specification sheets be made for each item of new equipment and these fastened together as a separate appendix to the report.

The central purpose of making an appendix to the report is to provide the superintendent, school board, and the purchasing agent or committee with specific information and detail of the type and kind of equipment desired in formal terminology understood by those who distribute or manufacture such equipment. Thus specified, one is assured of getting exactly what is wanted and without exasperating delay.

It is a wise procedure to indicate a priority or code designation of an article whenever practicable. This practice will be an aid to the purchasing agent and may facilitate delivery. Some equipment is of major importance in the proposal made for betterment of the program and should
receive first preference. In some cases equipment desired may require some special service features, as current of particular voltage. This must be given attention in order not to purchase an item of equipment that cannot be used with existing facilities. The new equipment may be of major importance largely by virtue of its expensiveness. An instructor must know and understand budget arrangements and availability of funds for the purchase of new equipment and supplies in order to do an intelligent job of selecting what he will add each year.

The appendix is a place where you must state clearly the equipment, materials and supplies for purchase next year.

Cost is of considerable importance here. Large totals should be avoided as people often scare easily at figures representing large expenditures of money. It is suggested that estimation of cost on each page of the appendix be kept at a minimum to avoid discouragement and a tendency on the part of the administrator to shelve requests involving large amounts. Economical management is a prime motive of most school boards and must be recognized in presenting requests for equipment and supplies. By being a little conservative an instructor can help the school board and yet secure for his department equipment and supplies which will enable him to make a distinct contribution to the school's program.
Summary.

In summarizing, a format to be considered in planning and organizing a report is presented. Its appearance here does not mean it is a pattern to be followed strictly. However, it does present possibilities to an industrial arts instructor who wishes to make a report of this type and especially for one confronted with the problem of making such a report to his principal.

Format to a Report

I. PHILOSOPHY

A. The Philosophy of the School in the Community.
   1. The aims and objectives of the school.

B. The Philosophy of Industrial Arts in the School.
   1. The purposes of the shop courses in the school.

C. The Philosophy of the Instructor in the Shop.
   1. The aims of the instructor in teaching industrial arts.

II. THE PRESENT STATUS OF THE SHOP

A. The Course of Study of the Shop this Year.
   1. The objectives for each course.
   2. The method of applying subject matter.
   3. The materials and sources.
   4. Teaching units, experiences and activities.

B. The Teaching Method Used in the Shop this Year.
   1. Description of the character and method of administering and teaching and the shop procedure for a typical class.
   2. Suggestions for next year.

C. Student Enrollment and Achievement in the Shop this Year
   1. Tabulation of class enrollment and statistics.
   2. Tabulation of findings from student personnel records.
   3. State the achievements accomplished during the year.
D. The General Accomplishment in the Shop this Year.
   1. Class accomplishment.
   2. Correlated projects with other subject areas.
   3. The departmental accomplishment of the shop this year.
   4. Extracurricular activities.
   5. Adult education and night school.
      a. Propose to serve the whole school.

E. Analysis of the Laboratory Plan.
   1. An analysis is not a criticism.
   2. Suggestions for next year.

F. Recorded Student Progress.
   1. The progress in units of instruction (subject matter knowledge).
   2. Development of attitudes and appreciations.
   3. Development of habits and clear thinking practices.
   4. Anecdotal records and behavior descriptions.
   5. Development of social sensitivity and student beliefs.

III. PROPOSED DEVELOPMENTS

A. Development of a Course of Study for Next Year.
   1. Aims for a new course of study.

B. Teaching Methods to be Used.
   1. The plan for attacking the new problems in the course of study above.

C. Relations of School Operation and the Shop Program.
   1. Statement of differences and grievances.
   2. Suggestion of practical solution to more harmony.

D. Proposals for Specific Physical Improvements Next Year.
   1. A floorplan.
   3. Show that the plan is commensurate with the purposes.
   4. Justify the scheme.
**IV. APPENDIX**

**A. Requisitions**
1. Materials and supplies. cost.
2. Equipment and tools. cost.

**B. Improvement Specifications**
1. Architectural remodeling. cost.
2. Major items of equipment. cost.
3. Minor items of equipment. cost.
CHAPTER 5
FINISHING AND DISTRIBUTING THE REPORT

This chapter provides suggestive information as to how the report should appear when finished. Likewise the manner of distributing the report to the public and to educational agencies which are not elements of the school system but nevertheless are in some way interested or associated with the school. The discussion will indicate and suggest the manner in which editing, rewriting, reproduction, illustrating and binding may be effected. The distribution of such a document involves some definite means of determining the number of copies to be produced.

All too often, industrial arts in its character and environment is not regarded as having great significance in what is usually considered formal education. A well written report will create a favorable impression among people who know little about industrial arts, trades and the study of the problems of labor relations and who sometimes question their significance.

It must be remembered that the report, as designed, is an instrument for public education. Many of those who know little about the subject are those who have a narrow concept of the broad function of education for youth in the secondary school.
The editing and rewriting of the report after the first draft has been completed requires careful and patient labor on the part of the writer. The use of clear and correct expression is essential. This will do much toward creating a favorable impression. Above all the document must be interesting.

The form of reproduction must be known at the outset. Mimeographing is the most likely form in most cases. A fancy or impressive form is not necessary. The important thing is an effective presentation of the educational philosophy, ideals and achievements of the department.

Recommended improvements or extensions to the plant may be shown by means of blueprints, photostats or multigraphs depending on what is available. Charts and tables may be duplicated in the same manner. It is not necessary to illustrate the report profusely but should a printing shop be available, an illustrated report will enhance its effectiveness.

Photographs of shop activities, printed or lithographed will make the report more impressive and effective as a document of public relations. Illustrations in color will provide richness and variety to the report. This is by no means necessary but definitely will attract and hold attention above any other one factor.

The binding of the report may include an attractive cover. Plastic binding or spiral punching and wiring may be used if money is available to cover the cost. A colored
cover will attract attention.

While printing of the report is by all means the preferred method of reproducing a report of this kind, the expense involved usually prohibits its use in most schools.

Distribution of the report to the public must be arranged through the superintendent and should carry his endorsement. Civic organizations may be included on the minimum mailing list. In many instances a superintendent may desire to take responsibility for the distribution of the report. If that is the case the distribution problem will be entirely out of the hands of the instructor.

Requests for copies for distribution by the instructor should be included whenever this practice seems desirable. These may include:

The County Superintendent of Public Instruction.
The State Supervisor of Vocational and Industrial Education.
The Teacher Training Departments of the Universities and Colleges in the state.
The Industrial Arts Associations.
Acquaintances of the instructor who are leaders in the profession.

Summarizing, the finished report should be a document which the superintendent can respect and will want to distribute widely.
CHAPTER 6
CONCLUSION

The annual industrial arts report to the principal is primarily a document for the cultivation of public relations, an informative instrument for the layman and an instrument of education for the administrator of the school. Secondly, the preparing of such a report should and can serve as a means for accelerating the instructor's professional outlook and growth through in-service study of his own problems with the aim of improving both himself and his program.

With the constantly changing educational objectives there is basis for assuming that the public needs to be continually informed of current practices and changing trends in education.

The annual industrial arts shop report is a means whereby public support may be influenced to stimulate and support advance toward progressive goals in education.

The writer is convinced that a report of the kind recommended in this study is a means of educating school administrators and the general public. This conclusion is based on the experience of having made two such reports. In each case the results achieved were most gratifying.

Anticipated outcomes are:

1. General, a more clear understanding of the function
of industrial arts and vocational education in the curriculum of the school. Likewise a more healthy and helpful attitude toward the work done in this important area.

2. A common feeling and agreement on the part of all, that industrial arts laboratories should be a place for offering all possible opportunity for students to explore many fields of industrial endeavor. Furthermore, such experiences should be a part of the general education of all boys and girls.

3. Belief by the public that all industrial arts laboratories should be well equipped and expertly staffed for the fullest accomplishment of the aims and objectives professed by industrial arts in general education.

4. Common agreement that general education is a process of "learning by doing", through experiences which are pertinent and meaningful in the lives of boys and girls as they grow up in a world of machines and science.
SELECTED BIBLIOGRAPHY

1. Alberty, Harold B.

2. Bonser, Frederick G.

3. Brunner, Herbert B. and Others

4. National Education Association

5. Proffit, Maris W. (Chairman)

6. Selvidge, R. W., and Gryklund, Verne C.

7. Smith, Eugene R. and Tuler, Ralph W.
   Appraising and Recording Student Progress, New York, Harper and Brothers, 1942, 504 pp.

8. Tyler, Ralph W.

9. Tyler, Ralph W.

71.

11. Warner, William E.  
"Principles and Examples of School-Shop Planning",  
ADDENDA
1939-40

ANNUAL REPORT

INDUSTRIAL ARTS LABORATORY

&

SHOP

West Des Moines Schools
H. W. Fearing
Superintendent

By

A. Gale Henke
Instructor

An increasing enrollment of 25 per cent in vocational courses during the past year indicates a national swing from rather academic types of education to a more practical program of specific training for vocations. A continued upsurge in evening school enrollments for both employed and unemployed persons in 1939, the greatest development of vocational education on the record, is probable.

-- John W. Studebaker, U. S. Commissioner of Education
INDUSTRIAL ARTS SHOP COURSES
Valley Jr. and Sr. High
West Des Moines, Iowa

"General Industrial-Arts Laboratory"

PHILOSOPHY

In general education, a new philosophy of method based upon present living is gradually replacing the old. Child interest, instead of adult life problems, serves as a basis of instruction. Children are given a chance to do their own thinking instead of being required to follow a routinized thought-killing procedure.

The general industrial-arts laboratory is a type of industrial-arts laboratory equipped to carry out the objectives of education in general, and industrial arts in particular, in the light of progressive educational philosophy. Organization and management should not be restricted to specific trades or professions. The laboratory should be equipped so that many types of activities can be carried on. These activities should be selected on the basis of contributing to the greatest growth and interest of the pupils.

Child interest is an important feature in this laboratory. Pupil interest is provided for by permitting the child to perform activities which are of vital importance to his present growth and happiness.

The general industrial-arts laboratory must act as an integrating agency to all of the other educational units. The laboratory is a vital unit within itself. Because of that vitality, it should help to bring to the attention of the pupils the importance of the school, and of each unit within the school, to life.

OBJECTIVES

The aims of general education should serve as the basic aims for the general industrial-arts laboratory.

The objectives which follow deal more directly with industrial arts.

1. Opportunity to explore, experiment, invent, and construct in an effort to satisfy self-expression.

2. Development of elementary skill in performing simple tool and machine operations.
3. Development of worthy attitudes, lofty ideals, discriminating appreciations.

4. To furnish the pupil with opportunities to gain knowledge and have experiences that will aid him in understanding his environment.

5. Development of consumers' appreciations and knowledge.

6. Development of initiative, self-confidence, leadership and cooperativeness.

7. To give vocational and avocational guidance.


**SUMMARY OF COURSE OF STUDY**

The course of study includes several units that are not in the present laboratory. They shall be added as equipment and floor space becomes available.

1. **Planning and drawing.** As a means of recording and communicating ideas, mechanical drawing ranks very high. Drawing must be thought of as a universal language. This language must be taught as the boys feel the need for it, especially in the Junior High grades. It is to lead from pictorial drawings, easily understood, to the more complex forms. Correct methods in freehand drawing will be taught as well as the use of drawing instruments. The majority of the pupils will become acquainted with drawing in connection with their work in the other units of the laboratory. This will be done by encouraging each pupil to plan and make drawings of his projects.

The planning units should include books and other sources of information, which will aid in the planning of a project.

2. **General woodworking.** In this, as in all of the units within the laboratory, pupil activities will depend upon pupil interest. Many types of work in wood will be presented.

In this laboratory unit, pupils will be given an opportunity to learn hand-tool processes and machine processes. Certain phases of home mechanics, not presented in other units, will be included here.

The aim of the instructor is to correlate all of the units within the laboratory with each other. This and the
other units will also be correlated as much as possible with the other activities of the school.

Since pupil activity based upon pupil interest is desirable, the greatest freedom shall be allowed in the selection of projects. The aim is to develop originality and interest in the work, to develop good habits, ideals, and attitudes.

The general woodworking course will include benchwork, a little millwork, patternmaking, finishing, and home mechanics.

3. Electricity. Electricity contributes largely to the progress of mankind. Because of that, and because of the appeal it has to many students, it is included in the general industrial arts laboratory. The electricity unit is to be correlated closely with science.

An attempt to give an elementary understanding of electricity and its many uses will be made by encouraging pupils to experiment and to construct and use simple electrical devices.

A correct vocabulary and correct methods in the few simple tool processes will be taught as the pupil experiments and constructs.

The general electrical course will include physics of electricity, use of electricity, and the importance of electricity as a product of modern civilization.

4. General metal. Each day, work in metal is becoming increasingly important. One has but to think of the automobile, farm machinery, machines of the factory, and appliances of the home to realize that a study of metal is necessary if any attempt is made to include units of work in materials that have influenced the destinies of mankind.

The general metal unit should offer many opportunities. Though at first, work in the unit may be somewhat limited, it is to be developed so as to include work in many types of metals. Units in bench, lathe, and sheet-metal work shall be included. Metal spinning, etching, and other forms of art in metal, shall be emphasized as well as other phases of metal work.

5. Mechanics. The principal purpose of introducing this unit of a work in the laboratory is that of making more intelligent consumers and operators of automobiles. The work, however, shall not be confined to the automobile. Other
types of mechanics, and a study of types of transportation shall be included.

6. Ceramics. Ceramics as interpreted here means work in cement as well as in clay. This unit offers unusual opportunities for the development of artistic tastes and abilities. This is the principal purpose for offering it. Another reason for including work in ceramics is the fact that it holds a much more important place among the industries of the world, past and present than is commonly supposed. The scope and possibilities in this as in all of the units shall be pointed out.

7. Leather. Work in the leather unit shall include construction of simple articles. The importance of selecting properly fitting footwear and methods of caring for shoes and other articles of leather will be taught. Tooling and other means of decorating will offer opportunities for self-expression and for the introduction of the principals of design.

FINAL ADDITIONS

8. Photography. Photography as a hobby, as well as an industry, is of growing importance. Millions of dollars are spent each year for cameras, films, developments, etc. Since that is true, isn't it wise to teach the American public how to take better pictures? That is the principal reason for introducing this unit. Methods of developing and printing shall also be included because of the interest many boys and girls have in such work. Participants in this unit should be given an opportunity to learn something about the huge motion-picture industry, characteristics of a good, as opposed to a poor movie and the way a motion picture camera and projector are operated.

9. Printing. When the printing press was invented, the civilization began to advance more rapidly. It is certainly true that the blotting out of all methods of printing would be a great blow to civilization. At least an elementary understanding of the importance of printing could and should be taught in this unit.

There will be many opportunities to correlate this unit with other branches of the school. The opportunities should not be overlooked.

CORRELATING UNITS

Many possibilities for correlation present themselves in the general industrial-arts laboratory. Those listed here are merely suggestions. No attempt has been made to cover all the possibilities.
Correlation may be made between the areas of the laboratory. This is easily done by projects that require work in several of the units for completion. There are the numerable examples of such projects. One cited to point out areas involved.

**Telegraph sending and receiving set.** To complete such a project would require work in the following areas: Planning, woodworking, metal, electrical and finishing.

Correlation may be made between the general industrial-arts laboratory and other units of the school.

**Science.** Equipment for the science department may be made by pupils enrolled in both departments or the pupils of the science department may be invited to use, under supervision, the facilities of the general industrial-arts laboratory.

Mounting boards, holders for equipment, or any simple apparatus that can be constructed by the pupils, may be considered as possible projects.

**History and social science.** The history of tools may be pointed out.

**English.** Some attention should be given to correct spelling and use of grammar in the laboratory. The English instructor may be asked to cooperate with the pupils in the preparation of shop papers and shop talks.

**Mathematics.** Figuring the quantity of supplies needed, the cost of materials, machine speeds, and areas to be finished, will furnish many opportunities of correlation with the mathematics department.

**Administration.** Printing forms to be used by the administration will serve as one method of correlation.

**Athletics.** Making of equipment for the athletic field would serve to correlate.

**Home Economics.** A correlation unit with home economics could be made by trading classes for several periods. The girls of the home-economics classes could be invited to use the facilities of the general industrial-arts laboratory to aid them in their work.

Correlations are possible between the general industrial-arts laboratory and the school as a unit. One very good example is an annual school carnival.

Correlations are also possible with the community as a whole and with community organizations.
TEACHING METHOD

There are many teaching methods that may be used singly or in combination. The best teachers usually combine several of them to get the best results.

In a laboratory such as the general industrial-arts laboratory, there will be fewer occasions when group demonstrations and other forms of group instruction are profitable. Whenever possible, however, this method should be used. An attempt is to be made to get the class together at least part of the time in one period per week for the purpose of talks, reports, discussion, and motion pictures on topics of general interest.

Most of the instruction in the laboratory is on the individual basis. A pupil will select his own project or experiment, make a drawing of it, prepare specifications, make an order slip for the necessary materials, list operations and check those about which he will need further instruction; select and study references pertaining to operations and related information which will aid in the making of the project of carrying out of the experiment, secure materials and construct the project or do the experiment. As he proceeds, he will at designated points get the instructor's approval. This will give the instructor the opportunity to point out mistakes, make suggestions and ask questions. The pupil is to call upon the instructor for aid whenever necessary. This aid will be given by suggesting references for further study, by giving demonstrations in correct procedure; by calling upon a pupil who has the necessary information or training to assist the one needing the help, and when possible, by assisting the pupil to discover correlations between the problem at hand and previous experiences. To follow this method successfully, the teacher must be constantly alert so as to recognize teaching situations as they appear.

The method of teaching as described in the foregoing paragraphs can be used after the pupil has had some experiences in the laboratory. More teacher direction will be necessary at first, in order to instruct the pupil to direct himself. This is necessary, for in previous school experiences the pupil may have been even prevented from using self-direction. The teacher direction should be such that the pupils are unconscious of it.

Permitting a pupil to select his project and direct his work may, if the teacher is not careful, set up a situation in which the attention of the pupil is too narrowly centered. Since it is better for the pupil to become somewhat acquainted with as many materials and manipulative processes as can be successfully offered in the laboratory,
the wise teacher will guard against the narrowing of the pupil's experiences in the laboratory due to this centering of interest. A good method to use is to have on exhibit in the laboratory many pictures, sketches, and models of projects that require work in more than one area. They will tend to interest the pupils and suggest things to make. The fact that a boy has classmates around him, will also aid in causing him to become interested in doing other things. Even though the boy does not actually do the manipulative work, the fact that he can observe his neighbor and ask questions will mean that he will gain some knowledge of other activities.

The organization and direction of the general industrial-arts laboratory will offer many opportunities for training in the development of desirable characteristics and habits. A method of teaching orderliness, cleanliness, and similar characteristics, is for the teacher to set an example and insist that all members of the laboratory follow suit. The desired result is likely to be lost if too much insistence makes a drudgery of the job. This must be avoided.

The student personnel system under careful supervision of the teacher is an excellent method of teaching many desirable habits such as willingness and ability to assume responsibility and leadership, recognition of authority, spirit of cooperation, etc.

No one should assume that the few methods mentioned in the foregoing are the only ones available to the efficient teacher. The success of any one method will depend to a great extent upon the amount of activity required of the pupil.

**PLAN OF LABORATORY**

In general the laboratory room is excellent in regard to the size, natural lighting, and relative geographic position with relation to the general school buildings. However, it should be understood that it is not a hallway to and from the athletic room and toilet.

**Heating.** The heating is very unsatisfactory, and especially with respect to the temperature. At no time can a regular temperature be depended upon, either in mild weather or in colder condition. Secondly, the type of blower is very unsatisfactory for classroom conditions. It is practically impossible to keep class attention for discussion or demonstration. Silence is necessary also for study which is often advisable during class periods.

**Lighting.** Lighting in certain areas is good, but on the other hand three feet from that area it is almost impossible
for careful accurate measurement readings that are so often necessary.

It is recommended that the lights with their shades be lowered and bulbs of a greater wattage be supplied. Consideration of diffused direct type artificial lighting should be given. Florescent lighting in the planning, and electrical areas would be of the best and most modern type, producing the best light for the greatest number.

AIR CONDITIONS

Ventilating facilities due to the poor heating facilities are impossible to use. A suction fan in the upper northwest corner would be advisable if the heating situation would permit it. Shop conditions become very dusty, necessitating an expulsion of all fine material that permeates the air.

JANITOR SERVICE

Due to the excess of sandpaper dust and in-tracking from out of doors of each class, the dust and dirt situation becomes comparable to the conditions of a hallway plus the sandpaper dust. Sweeping compound is essential with regular and careful sweeping and dusting of all equipment almost daily. Cleaning of sink facilities and soap supply along with the towel supply has not been regular and very regularly neglected.

Due to the constant working in the shop with the hands, it is quite necessary to afford a place well equipped for the washing of hands. During the present year janitor service has been exceptionally poor.

BUILDING CONDITIONS

Aside from the heating and ventilating conditions in the shop, the room becomes flooded whenever it rains with from one to three inches of water in about one-third the central area, extending from the athletic room to the drinking fountain floor drain. This condition is caused by a poor expansion joint between the central section of the stadium and the south one-fourth. For tool storage conditions the dampness is very bad, also it is quite unsatisfactory for the health of those who have to work in the dampness. Above all things this should be mended.

EQUIPMENT

Because of its physical potentialities the general Industrial-Arts Laboratory as planned for the West Des Moines Schools should be the best equipped small high-school labora-
tory in Iowa. No opportunity should be over-looked for supplying the necessary tools and machines for work in the units as planned and suggested.

The planning and drawing unit should contain numerous reference books. A cupboard for drawing equipment is highly recommended for next year's storage for that material and tools. This is necessary for the aid in caring and endurance of that equipment which is somewhat fragile in construction.

A file should be provided for keeping records, project sheets, and lesson sheets of various kinds.

The woodworking unit of the laboratory should be equipped with two general woodworking benches having twelve individual lockers underneath and possessing four wood vises each. Power tools for this unit should include a ten inch tilting arbor circle saw well equipped with motor and guards. A twenty-four inch direct drive Jig Saw complete with light and bench. Two all-purpose wood Lathes complete with accessories, and benches. A six inch jointer complete with base and guards. A bench shaper with a set of bits would enhance the design of every piece produced in this unit.

It is highly recommended that a Woodworking Tool Panel for next year be supplied and placed in the south end of the shop. The tool storage room may then be removed.

In the metal unit should be found a machine bench with four machinest's metal vises, a sheet metal bench with a stake bed with a bar folder on one end and a slip roll former on the other. The drill press should be supplied with mortising and routing attachments for woodworking. One of the woodturning lathes is to be converted into a metal-spinning lathe.

Much of the work in the electrical unit may be done on the general working benches. However, a special electrical bench has also been provided, equipped with four soldering iron furnaces and seven double electrical outlets, all with cupboards below. However, equipment should be such that the student may experiment and also construct simple elec-

---

1 The planning unit should be partitioned from the woodworking area by a glass partition to the ceiling, with a glass door offering passage. Dusty and noisy atmosphere of the working shop should not be combined with a reasonably clean and quiet planning area.

2 Three sections of open storage lockers 36 each (6 x 6) should be supplied for individual storage of projects and experiment materials. **Locker Area.**
rical devices, and get practical instruction in general wiring.

The mechanics unit should be equipped with a complete 1938 Ford V-8 motor and transmission assembly mounted on a stand which can be used for instruction and practice in assembly and disassembly. Arrangements can be made with the Ford Motor Company whereby the motor unit is to be changed whenever it becomes out of date. A second-hand chassis from another company should also be furnished to the mechanics unit.

The ceramics unit should be supplied with a built-in materials storage cabinet for cement, sand and clay damp box. A potter's wheel and table should be included.

The finishing unit should be accessible, completely partitioned from the dusty area of the work shop. A storage cabinet with lock should be therein for the storage of all finishing equipment and materials. A small portable spray machine should be included in the equipment.

To aid in the identification of equipment, a system of color coding can be worked out. All tools that are for use in a particular unit can be marked with the same color. If a tool is to be used in several units, that will also be indicated by having colors on the several units on the tool. This method of color may be extended to include instructional aids in the planning area's library section as well.

An illustration may serve to explain more fully the method of color coding. Assume yellow is the color adopted for the woodworking unit. In that case, all tools, benches, cabinets and machines should be marked in some way with yellow; the sections of the bookcase in which woodworking books are kept could be marked; instruction sheets could be yellow; posters and other visual aids could be marked in yellow. In fact, everything in any way connected to woodworking could be so marked. Of course, this marking must be done in a manner that will not spoil the appearance of the laboratory.

General working benches are in such a decrepit condition that their renovation would be almost as expensive as the purchase of new ones. The condition of the vises is far beyond repair and new ones are needed. Under no condition can the present benches endure another school year.

It is highly recommended, therefore, that new benches be considered very seriously in the next year's new equipment.
PUBLICITY

In the past, school officials and teachers have given little thought to the best methods of effectively promoting public relations. Frequently, the school has been a stranger in its own community.

Publicity for the school cannot be effectively secured if left to one person. The task of informing the public is a task for all who are interested in the welfare of the school. Teachers as well as administrative officers and friends outside of school must give more attention to the job of interpreting the school to the public. This applies especially to industrial-arts teachers, for according to several leaders a public-relations program is very much needed in the industrial-arts field. Many opportunities present themselves by which the industrial-arts teacher may favorably interpret his department to the public. Every opportunity for publicity should be used to promote carrying out the vitally important program it has to offer. The industrial-arts program should not only be publicized and interpreted for the public in general but every effort should be made to advertise it favorably to the school board, administration, fellow teachers, and school pupils.

A few suggestions as to methods of making the public conscious of the industrial-arts department and program follow. No attempt has been made to exhaust the possibilities.

(1) Exhibits,  (6) extracurricular clubs,  
(2) visitation,  (7) talks,  
(3) reports,  (8) participation in community activities,  
(4) department handbook  (9) membership of teacher in clubs and organizations, and  
(5) publications  (10) motion and still pictures

As many methods of publicity as may be practically applied are to be used for the general industrial-arts laboratory.

Bibliography:  "The Oberlin Arts and Industries Development"  
W. R. Williams, Jr.  
Development Supervisor,  
Arts and Industries Building,  
Oberlin, Ohio

"Industrial-Arts Laboratory Planning"  
William L. Hunter  
Head, Department of Industrial Arts  
Iowa State College,  
Ames, Iowa
"General Industrial-Arts Laboratory"
Merrit Pease
Springfield Township High School
Holland, Ohio
CABINET WORK

1 - Woodworking Tool Panel in Car Siding Finish (pine) - 30.00

1 - Mechanical Drawing Equipment Cupboard
    Car Siding Finish (pine) - 25.00

1 - Glass Partition for Planning and Drawing Area
    Car Siding wainscoting - with one Glass Door - 100.00

1 - Cement & Sand Storage Bin Car Siding Finish - 20.00

Estimates in cost

Industrial Arts
METAL WORKING EQUIPMENT

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>No. SM-60</td>
<td>Sheet Metal Bench</td>
<td>1</td>
</tr>
<tr>
<td>1-</td>
<td>No. MB-32</td>
<td>Machine Bench</td>
<td>1</td>
</tr>
<tr>
<td>1-</td>
<td>No. 63</td>
<td>Bar Folder</td>
<td>1</td>
</tr>
<tr>
<td>1-</td>
<td>No. 382</td>
<td>Slip Roll Former</td>
<td>1</td>
</tr>
<tr>
<td>1-</td>
<td>No. 622</td>
<td>All-in-one Rotary Machine complete with accessory rolls</td>
<td>1</td>
</tr>
<tr>
<td>3-</td>
<td>No. 927</td>
<td>Creasing stake</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No. 904</td>
<td>Break Horn stake</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No. 925</td>
<td>Blow Horn stake</td>
<td>1</td>
</tr>
<tr>
<td>4-</td>
<td>No. 604</td>
<td>4&quot; Utility Bench Vises</td>
<td>1</td>
</tr>
</tbody>
</table>

Brodhead-Garrett Co. Annual Catalog No. 39

Industrial Arts
WOODWORKING EQUIPMENT

2- No. 4 Locker Type Woodworking Benches complete with vises 190.00

1- No. 1165 10" Tilting Arbor Saw complete with base and guard - motor included 119.60

1- No. 917 24" Direct drive Jig Saw complete with light, and bench 65.30

2- No. 752 37" All Purpose Lathes complete with 9LB15 Lathe benches & Accessories - 84.05 168.10

1- No. 609 6" Jointer complete with guards and base 100.75

1- No. 45 Bench Shaper Complete with 46 set of 10 shaper bits 30. 76.00

Brodhead-Garrett Co. Annual Catalog No. 39

Industrial Arts
ARCHITECTURAL SPECIFICATIONS

Walls shall be acoustical plaster above the wainscoting, coefficient of absorption to be not less than 50%.

Ceiling shall be of 5/8" paper covered celotex of a white color.

Floors shall be of semi-smooth cement, marked and zoned for operator safety and isles of travel.

Partitions shall be of steel and glass type, panel-pack construction, 42" up and glass to the ceiling. Doors shall be steel with 1/2 glassed above. These partitions can sometimes be produced in replica by using 2" x 4"'s and quarter-round molding to hold the glass.

Doors for the automotive and hot metals area shall be steel construction with 2/3 windows with overhead construction for opening above the working area.

Flues shall be piped from the spray booth and from the hooded section to be installed over the hot metal area to the outside, each section with a suction fan installed for exhausting the fumes and expelling spray.

Decorations shall embody green tile 42" up with buff walls and white ceiling, machines and benches as well as glazed panels shall be of forest green. Floor zoning and marking shall be in white.

Air Service shall be produced by a compressor unit at the back of the cloak room and outlets piped into the ceramics spray booth and in the automotive area adjacent at the same vicinity.

Power Service in electricity is both 110 V. single phase and 220 V. three phase current.

Drainage is as is indicated in the plan. Additional service shall be developed in the photography area.

Water Service is as is indicated in the plan. Additional service shall be extended into the photographic area.

Gas Service is as indicated in the plan, ½" pipe size.

Ramps for entrance into the automotive area is very adequate for the under the surface entrance.
Windows are as indicated as in plan, of the pivoted window with lock bar. Industrial frosted glass is used. It is recommended that clear glass be installed.
SHOP ENROLLMENT 1939-40

FIRST SEMESTER

<table>
<thead>
<tr>
<th>Grade</th>
<th>Course</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-B</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>7-A</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>8-B</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>8-A</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>9-B</td>
<td>Mechanical Drawing I</td>
<td>5</td>
</tr>
<tr>
<td>9-A</td>
<td>Woodworking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Girls Club</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>143</td>
</tr>
</tbody>
</table>

Average Daily Load: 78
Pupil per Hour Load: 13

SECOND SEMESTER

<table>
<thead>
<tr>
<th>Grade</th>
<th>Course</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-B</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>7-A</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>8-B</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>8-A</td>
<td>Shop</td>
<td>2</td>
</tr>
<tr>
<td>9-B</td>
<td>Mechanical Drawing I</td>
<td>5</td>
</tr>
<tr>
<td>9-A</td>
<td>Woodworking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H.S. Advanced Woodworking</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Girls Club</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>177</td>
</tr>
</tbody>
</table>

Average Daily Load: 105 3/5
Pupil per Hour Load: 17 1/2

Fullest Days Schedule

<table>
<thead>
<tr>
<th>Grade</th>
<th>Course</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>9-B Mechanical Drawing I</td>
<td>Tuesday-Thursday</td>
</tr>
<tr>
<td>II</td>
<td>9-A Woodworking</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>H.S. Advanced Course</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>7-A Tuesday-Thursday</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>8-B Monday-Wednesday</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>8-A Tuesday-Thursday</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H.S. Advanced</td>
<td></td>
</tr>
</tbody>
</table>

At present the shop has approximately 20 working stations.
### VALLEY JR. HIGH BOYS REPORTING FOR SHOP
#### 1939-40

<table>
<thead>
<tr>
<th>Description</th>
<th>9A</th>
<th>9B</th>
<th>8A</th>
<th>8B</th>
<th>7A</th>
<th>7B</th>
<th>113</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys who have had more than ½ yr. of shop</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys who have had ½ yr. of shop</td>
<td>8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Boys who have had some mechanical drawing</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Boys who have access to a shop at home</td>
<td>18</td>
<td>19</td>
<td>16</td>
<td>16</td>
<td>18</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Boys who have tools of their very own</td>
<td>9</td>
<td>19</td>
<td>18</td>
<td>15</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys who have NO mechanical drawing</td>
<td>5</td>
<td>22</td>
<td>18</td>
<td>14</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys who have NO tools of their very own</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>4</td>
<td>18</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

#### MOST LIKED SUBJECTS IN SCHOOL

<table>
<thead>
<tr>
<th>Subject</th>
<th>4</th>
<th>6</th>
<th>3</th>
<th>3</th>
<th>2</th>
<th>6</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>History</td>
<td>7</td>
<td>5</td>
<td>13</td>
<td>1</td>
<td>2</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Shop</td>
<td>2</td>
<td>9</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing and art</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geography</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boys Whose Hobbies Are:</th>
<th>(No Hobbie--)</th>
<th>3</th>
<th>8</th>
<th>3</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport</td>
<td>3</td>
<td>11</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>5</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Models</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Stamps</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collections</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total                   | 9  | 25 | 14 | 24 | 19 | 22 | 113 |
## CURRICULUM

Valley Jr. and Sr. High Schools, West Des Moines, Iowa

<table>
<thead>
<tr>
<th>Grade</th>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-B</td>
<td>Exploration of the Crafts</td>
<td>twice yearly</td>
</tr>
<tr>
<td>7-A</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>8-B</td>
<td>General Elementary Electricity</td>
<td>&quot;</td>
</tr>
<tr>
<td>8-A</td>
<td>General Metals &amp; Cement</td>
<td>&quot;</td>
</tr>
<tr>
<td>9-B</td>
<td>Mechanical Drawing I</td>
<td>&quot;</td>
</tr>
<tr>
<td>9-A</td>
<td>Woodworking II</td>
<td>&quot;</td>
</tr>
<tr>
<td>H.S.</td>
<td>General Shop III</td>
<td>once in four yrs.</td>
</tr>
<tr>
<td>H.S.</td>
<td>Advanced Woodworking &amp; Lathe  IV</td>
<td>&quot;</td>
</tr>
<tr>
<td>H.S.</td>
<td>Advanced Mechanical Drawing  V</td>
<td>&quot;</td>
</tr>
<tr>
<td>H.S.</td>
<td>Advanced Metal and Electricity VI</td>
<td>&quot;</td>
</tr>
<tr>
<td>H.S.</td>
<td>Auto Mechanics and Welding    VII</td>
<td>&quot;</td>
</tr>
<tr>
<td>H.S.</td>
<td>Farm Shop &amp; Cement</td>
<td>once yearly</td>
</tr>
</tbody>
</table>
Industrial Art Dept.
Valley Jr. Sr. High
West Des Moines, Iowa

PROPOSED PROGRAM OF STUDIES

7-B
& Exploration of the Crafts twice yearly
7-A

An elemental orientation and study of simplest and most likely and easily manipulated hand tools for boys in making of art craft and wood toys, small shelves, etc. Emphasis being placed on care and correct use of tools. Principle of Mechanical Drawing introduced.

Individuals construct problems of their own desire which have been approved.

8-B General Elementary Electricity twice yearly

An elemental study of circuits, wiring and names and uses of electrical supplies. Fundamental mechanics of splices, wiring of bell circuits, lighting circuits and study of magnetism, battery, telephone and telegraph with practice in using soldering iron with other materials. Individuals practice assembling assigned problems.

8-A General Metal and Cement twice yearly

An elemental study of metals used in bench work and how to manipulate metal in cutting, filing, bending, twisting, fastening with rivets, punching, and drilling. Use of tap and die and metal finishing. At least three weeks of cement work in combination with some metal problem.

Individuals choose and construct from materials, their own problems.

9-B Mechanical Drawing (Ind. Art I) twice yearly

Mechanical Drawing for beginners, lettering, Isometric to Orthographic -- Orthographic to Isometric and finally the construction of working Drawings and dimensioning of them all in pencil work.

Individuals progress as rapidly as they are able.

9-A Woodwork (Ind. Art II) twice yearly

Secondary use of all woodworking hand tools and the extended use of them with the making of a simple useful piece of furnishing with the study of woods and finishes and the kinds of fastenings in wood. Jointing and gluing developed from the individuals own design.

Individuals design and construct their own problems.
H.S. Advanced General Shop (Ind. Art III) once in 4 years

A general course for second year High School boys including study and application of drawings, wood, metal electricity, and cement. Individuals experiment in all fields.

Individuals choose and construct something combining two or more fields. Assignments may be given. No prerequisite

H.S. Advanced Woodworking & Lathe (Ind. Art IV) once in 4 years

Advanced methods and use of machines in designing and making finer furniture of hard woods and wood turning practice and use included.

Prerequisite Ind. Art I-II

H.S. Advanced Mechanical Drawing (Ind. Art V) once in 4 years

Orthographic Projection -- Machine Drawings
Architectural Drawings -- Use of Inking and Developments with the study of Blueprinting.

Prerequisite Ind. Art I

H.S. Advanced Metal & Electricity (Ind. Art VI) once in 4 years

Advanced methods in metal construction including heating metal and construction of more difficult metal work. Study and practice of Sheet Metal and Soldering construction with bench metal. Study of foundry work and perhaps simple moulding. Six weeks study of Electricity and Magnetism, motor and practical house wiring.

Prerequisite Ind. Art III or I and II

H.S. Auto Mechanics and Welding (Ind. Art VI) once in 4 years

Study of the elemental principal of the internal combustion engine and automotive construction with practical problems worked on in shop and six weeks study and practice of welding both electrical and acetylene.

Prerequisite Ind. Art III or IV

H.S. Farm Shop once each spring

Group project work in wood and metal construction of major farm problems. Practical study of figuring materials and estimates of cost. Principle of simple forge processes and practical use of cement work in making foundations and building forms and mixtures. (Limit of 2 sem. credit) No Prerequisite
1940-41 ANNUAL INDUSTRIAL ARTS PRINCIPAL'S REPORT

University High School, Iowa City
INDUSTRIAL ARTS

Industrial Arts Department

A. Gale Henke, Instructor

Definition

Industrial arts is a form of general education. It provides learning through experiences, understandings and appreciations of materials, tools and processes. It provides learning through experiences with products and vocational conditions and requirements incident generally to manufacturing and mechanic industries.

Philosophy

In general education, a new philosophy of method based upon present living is gradually replacing the old. Child interest, instead of adult life problems, serves as a basis of instruction. Children are given a chance to do their own thinking instead of being required to follow a routinized thought-killing procedure.

Usually the industrial arts laboratory is a type equipped to carry out the objectives of education in general, and industrial arts in particular, especially in light of progressive educational philosophy. Organization and management is not restricted to specific trades or professions. The laboratory should be equipped so that many types of activities can be carried on. These activities should be selected on the basis of contributing to the greatest growth, interest and needs of the pupils.

Child interest is an important feature of a laboratory of this kind. Pupil interest is provided for by permitting the child to perform activities which are of vital importance to his present growth and happiness.

The general industrial arts laboratory may act as an integrating agency to all of the other educational units in the school. The laboratory is a vital unit within itself. Because of this vitality, it should help to bring to the attention of the pupils the importance of school, and of each unit within the school to life.

Objectives of this Laboratory

The major objectives of the laboratory of arts and industries are:

1. To further the students interests and understanding of modern industry, its materials, processes, and the social economic life that results.
Industrial Arts Department

A. Gale Henke, Instructor

2 - To give each student an opportunity to follow his special industrial interest and to learn advanced operations and skills typical of modern practice in the trade or industry.

3 - To develop consumer intelligence in the selection, care and safe use of the products of modern industry.

4.- To develop wholesome leisure-time interests in craftwork and industrial processes.

5.- To give an increased appreciation of the place of design in machine-made products.

6 - To vitalize training in all instructional areas of the school curriculum by giving opportunity for learning through real experiments with materials and tools.

Objectives of Industrial Arts in Education

While the aims of general education should serve as the basis for industrial arts the following objectives deal more directly in minor detail to industrial arts.

1 - To offer opportunity to explore, experiment, invent and construct in an effort to satisfy self-expression.

2 - To develop elementary skill in performing simple tool and machine operations.

3.- To develop worthy attitudes, lofty ideals, and discriminating appreciations in the life in which we live.

4 - To furnish the pupil with opportunities to gain knowledge and have experiences that will aid him in understanding his environment.

5 - To develop initiative, self-confidence, leadership, and cooperation.

6 - To give vocational and avocational guidance.

7 - To develop safety consciousness and good habits.
Industrial Arts Department
A. Gale Henke, Instructor

Habits Which Are Stressed

Accuracy Initiative Sincerity Orderliness
Good Judgement Observation Economy Perseverance

Proposed Curriculum Content

Introductory Industrial Arts
(Grades 7 - 8)

Understanding and elementary practice of taking materials, tools, and putting them together in a process of planning, study and use to produce a project. Experiences are to include woods, metals, the use of all the elementary tools, the correct terminology. An orientation in mechanical drawing which will include all correct and fundamental practices.

Pupils will be allowed to construct a problem of their own selection and design through advice as to selection in accordance with their ability.

Class projects in the more difficult problems of the more technical areas will be used. Exploration by group may dominate where practice cannot provide individual participation, because of its difficulty.

Fee. $1.50

Industrial Arts Orientation
(Grades 9 - 10)

Practical orientation and study to lead to insight of the various areas through experience and practice in them.

Mechanical Drawing
Woodworking
Cold Metal Working
*Ceramics
*Electricity
*Hot Metal Molding
Elementary Forge Practice
*Automotives
*Machine Lathe

(* Indicates areas which are not at the present developed.)
Industrial Arts Department

A. Gale Henke, Instructor

Pupils will be expected to rotate in all these areas and will be guided in selecting problems which will require experience in each area of endeavor.

Study problems will include gaining knowledge of materials, tools, and processes in each field.

Pupils may elect the field that they decide to study after an initial four weeks of practice and review of drawing and planning, which is first in importance to all other endeavor in other areas.

Pupils may select problems and design them for their practical experience in each area.

Assigned library research will be posted and study may extend as far as the student wishes to go.

Fee. $2.00.

Advanced Industrial Arts

(Grades 10 - 11)

Practical experience and study of the processes that lead to more vocational aspect with regard to the various materials, especially in industry.

A more technical analysis of the materials, tools, and processes will continue through study from the orientation course for 9th and 10th grades.

Additional areas will receive attention:

- Pattern making
- Welding (electric arc, and acetylene torch)
- Graphic Arts and Printing

( * indicates areas which are not at the present developed)

Students will go into the study of the various areas with the idea of finding out what the vocation, including the skills, materials, tools and processes, is likely to be.

EXAMPLE: A boy wants to know what a machine operator has to do. He studies this as a vocation from reading materials. He decides that he wants to try it to see if he is able to manipulate the machine and if he will like the work, and can adjust himself to the new skills necessary. He studies and performs some practice exercises and finds that he can and does like to operate a machine lathe. He then wants to make something really nice, testing his skill and pleasure. He therefore searches for a problem, or perhaps designs one which might in turn lead him to another field, perhaps that of foundry work. Then he wants to try
Industrial Arts Department

A. Gale Henke, Instructor

that. All his pursuits at this level in the school laboratory of industries must be carried on at a technical plane.

Prerequisites are the Industrial Arts Orientation of the 9th grade.
Fee. $2.00

Industrial Arts Specialization
(Grades 11 - 12)

The pupil must have a prerequisite of industrial Arts Orientation and the approval of the principal and the instructor. He may "specialize" in any of the areas for a semester at a time. Therefore, in the course of the year he will have to decide on two areas in which he will concentrate his working time.

Individual problems may be selected with approval and plans with procedures turned to the instructor for approval. Two major items of construction may be made or perhaps one that would include work in two areas as wood and metal or automotives and welding.

Specialization areas will include any two of the following:

*Automotives
*Ceramics
  Cold Metal
*Hot Metal
*Electricity and Radio
*Graphic Arts and Printing
*Mechanical Drawing (Advanced)
*Welding
  Woodworking (Cabinet making)

(* Indicates areas which are not at the present developed.)

All accomplishments in this advanced course are to be problems which will involve technical understanding and study. Elementary processes are to be frowned upon and not permitted except in the most extreme case.

Accomplishments of 1940-41

7th and 8th Grade Industrial Arts

At the outset in seventh and eighth grades, examination of the laboratory, its contents and the tools were all
Industrial Arts Department

A. Gale Henke, Instructor

studied and discussed. Names and terminology became and began to be heard in the daily conversation about the shop.

The importance of care, in use and handling and keeping tools was discussed. At the first of the year most of the tools were rehabilitated, oiled and sharpened. The value of a keen edge was discussed and demonstrated.

A preliminary practice period of six weeks was spent in practical shop sketching and plan drawing. Problems of geometric principle were discussed and demonstrated. Later practice was done by pupils with the necessary tools. The kinds of drawings were differentiated and plans were drawn of objects which were assigned from drawing manuals.

At the completion of the drawing unit each pupil selected, with the guidance of the instructor, a project he would make, and drew a plan including dimensions and materials needed. During this time discussions of the qualities of a good project were enumerated. As plans were completed each pupil ventured into the working area of the laboratory and selected his materials and began work on his problem.

Discussions and demonstrations interrupted work quite often at first. Principles of using elementary tools were shown and questions were asked. Often pupils were asked to demonstrate and comments went around about his good and bad technics.

As new problems constantly arrived then study problems were looked upon from the discussion and demonstration groups. When finishing became a problem, everyone stopped work and methods and practices were demonstrated on a piece of work in that stage.

Woodworking construction involved most of the time. Some art metal problems were designed and finished as short time projects near the end of the semester.

In general, the eighth grade operated at a relatively higher level of skills and accomplishments than did the seventh grade. By the second semester equipment was in better order and less time was wasted in managing makeshift means of accomplishing a thing in the right way.

9th Grade and Advanced Industrial Arts

Both the 9th Grade and the advanced group in Industrial Arts practiced and studied quite similar programs. This was found to be advisable by preliminary testing on the outset of the courses. Advancement in understanding was made with more rapidity than was the case in the 9th Grade.

Both groups entered into the study and practice of mechanical drawing technics and were continued at all times
Industrial Arts Department
A. Gale Henke, Instructor

with the idea of making a plan for each pupil's own as the final drawing. Fundamentals of mechanical drawing were practiced, studied and discussed through demonstration and questioning problems that were presented from time to time.

After proficiency in the drawing art was arrived at and the assigned plates were finished, each student selected a problem that he would make in the working areas of the Shop. A complete plan was made in every detail by means of the principles which had just been studied. Problems of the student's choice were approved in almost every case. His plan included three views, detailed with dimensions and a material bill to indicate the material needed.

Plan of proceeding was studied in general practice and an outline of the individual procedure was made on the back of the plan. With this plan and procedure the student entered the working area of the laboratory and began work on his problem.


Demonstration and discussion interrupted the working time, first at regular intervals and as time went on fewer and fewer demonstrations seemed necessary. Class meetings for questions and discussion averaged more than one per week.

Woodworking was the principal area worked until the second semester when wrought iron scroll work, elementary forge practice and tin work found their place as equipment for this work was repaired and arranged. Woodworking machinery was slowly placed at the disposal of the advanced class as they proved their understanding and capability of its careful use. Lathe work in the 9th Grade seemed to be most popular as is the usual thing.

By the third quarter of the year every student had quite clearly in mind the possibility of individual study on his immediate problem before becoming involved with difficulties. Usually, extensive research in problem needed insistent guidance by the instructor.

Workmanship which is above mediocrity was always insisted upon; careless practices were not allowed.

General Organization of Class Personnel

Each class elected to permanent leadership a Superintendent, a Rolltaker and Timekeeper, a Tool Foreman, a Clean-up Foreman, a Drawing Room Foreman, and an Emergency Foreman. Under this leadership were Monitorships composed by the
Industrial Arts Department

A. Gale Henke, Instructor

remaining personnel of the class which functioned through rotating duties or appointments from the Superintendent and checked in their work by the Foremen. A "Duties Wheel" accomplished this rotation regularly.

This system left all detailed routine to the student and the instructor was left free to accomplish instruction, guidance and conference in far greater degree than otherwise would be done.

The efficiency of this scheme improved remarkably as the year went on.

Teaching Methods

There are many teaching methods that may be used singly or in combination. The best teachers usually combine several of them to get the best results.

In a laboratory such as the general industrial arts laboratory, there will be fewer occasions when group demonstrations and other forms of group instruction found profitable as the students advance. Whenever possible, however, this method is used. An attempt is made to get the class together at least part of the time in one period per week for the purpose of talks, reports, discussion on topics of general interest.

Most of the instruction in the laboratory is on the individual basis. A pupil will select his own project or experiment, make a drawing of it, prepare specifications, make an order slip for the necessary materials, list the operations and check those about which he will need further instruction, and information which will aid in the making of the project or carry on the experiment. As he proceeds, at designated points he gets the instructor's approval. This gives the instructor the opportunity to point out mistakes, make suggestions and ask questions. The pupil calls upon the instructor for aid whenever necessary. This aid is given by suggesting references for further study; by giving demonstrations in correct procedure; by calling upon a pupil who has the necessary information or training to assist the one needing the help, and when possible by assisting the pupil to discover correlations between the problem at hand and previous experiences. To follow this method successfully, the teacher is constantly alert to recognize teaching situations as they appear.

This method of teaching as described in the foregoing paragraphs, can be used after the pupil has had some experiences in the laboratory. More teacher direction is necessary at first, in order to instruct the pupil to direct himself. This is necessary, for in the previous school experiences
Industrial Arts Department

A. Gale Henke, Instructor

the pupil may have been prevented from using self-direction. The teacher direction here is such that the pupils are unconscious of it.

Permitting a pupil to select his project and direct his work may, if the teacher is not careful, set up a situation in which the attention of the pupil is too narrowly centered. Since it is better for the pupil to become somewhat acquainted with as many materials and manipulative processes as can be successfully offered in the laboratory. The wise teacher must guard against the narrowing of the pupil's experiences. A good method to use is to have on exhibit in the laboratory many pictures, sketches, and models of projects that require work and suggest things to make. They will tend to interest the pupils, and suggest things to make. The fact that the boy has classmates around him, who are busy working in other areas doing things he is not engaged with, will also aid in causing him to become interested in doing other things. Even though the boy can observe his neighbor and ask questions, it will mean that he will gain some knowledge of other activities.

The organization and direction of the general industrial arts laboratory will offer many opportunities for training in the development of desirable characteristics and habits. This method of teaching orderliness, cleanliness, and similar characteristics, is done by the teacher setting example and insisting that all members of the laboratory follow suit. The desired result is likely to be lost if too much insistence makes a drudgery of the job. This must be avoided.

The student personnel system under careful supervision of the teacher is an excellent method of teaching many desirable habits such as willingness and ability to assume responsibility and leadership, recognition of authority, spirit of cooperation, etc.

No one should assume that the few methods mentioned in the foregoing are the only ones available to the efficient teacher. The success of any one method still depends to a great extent upon the amount of activity required of the pupil.
PUPIL PERSONNEL ORGANIZATION

West Des Moines, Iowa
Industrial-Arts Laboratory
West Des Moines, Iowa

"System of Clean-Up Each Period"

This year being the first year that all Junior High Grades have had opportunity to participate in Shop activities the problem of organization in clean-up duties was a rather necessary one because the pupils were not used to replacing things to their proper and respective place in tool panels and tool storage areas.

Having observed the "Duties Wheel" in use in other schools it was definitely bound for a trial in this situation. Each class was organized into eight monitor jobs or duties. Four of which were clean-up jobs and four of which were checking tool replacement.

**TOOLS**
- Check clamps and tools left in wood storage area.
- Arrange top shelf in tool storage area.
- Arrange bottom shelf in tool storage area.
- Check finishing equipment and finishing room.

**CLEAN-UP**
- Clean up power tool bench.
- Clean up Library area and straighten chairs.
- Clean up wood storage area and pick up scraps.
- Clean up work benches.

Each class held an election of their Shop officers and the following were elected:

- Shop Superintendent
- Shop Roll Taker and Timekeeper
- Tool Foreman
- Clean-up Foreman

These officers served their class for the duration of one semester.

Each class voted to try the method, and the teacher did not force the plan upon them. There was seen a need for such procedure and the boys were willing to put it to a trial.

After the trial was given they each as a class voted to adopt it as a method and "Duties Wheels" were made by the teacher on a little larger scale and placed on a wall bulletin board, each class having a portion for their notices and job assignments.

After 24 weeks of the "Duties Wheel" operation the efficiency of the plan began to take effect. With a good deal less than usual prodding the shop was put in shipshape in far less time and with a great deal more enthusiasm.

Officers did not have to jack the monitors up as often
and minute detail began to be watched more closely.
Cause of this is no doubt due to the fact that the
wheel had completed its rotation and boys were coming up
on the job that they had performed once before.
The second year should be a cinch.

Responsibilities of Shop Officers

SHOP SUPERINTENDENT (1)

The SUPERINTENDENT of the class should feel responsi-
ble for the good behavior as well as the poor behavior
of the FOREMEN and all the other class members. He is
merely to oversee everything that goes on in the shop.
If absences occur in the line of duty he should either
appoint someone to do the job or do it himself. the
SUPERINTENDENT is to superintend the foremen in their
duties and to supervise the regular class members in
their duties.
The SUPERINTENDENT shall take roll if the ROLLTAKER
is absent.
the SUPERINTENDENT shall act as CLEAN-UP FOREMAN
if he is absent.
The SUPERINTENDENT shall act as TOOL FOREMAN if he
is absent.

SHOP ROLLTAKER AND TIMEKEEPER (1)

The ROLLTAKER is to take roll immediately upon the
arrival of all the class members, reporting all tardies
and checking absences in the teacher's record book.
Time for tardies and clean-up as well as dismissal
will be announced by the ROLLTAKER, subject to change
by the order of the SUPERINTENDENT.

TOOL FOREMAN (1)

The TOOL FOREMAN of the class should observe in
every detail whether the tools are properly and care-
fully as well as quickly put away in their correct
storage place. He should help the process, if neces-
sary, and fill in vacancies caused by absences in his
MONITOR'S jobs.
The TOOL FOREMAN is superior to four MONITORS who
are under him.

TOOL MONITORS

All MONITOR'S duties are for only one week duration
at which time a change or release will be posted by the
rotation of the Duties Wheel.
Tool Room Monitors (2)

Those whose duties it is to arrange the shelves of the tool room should be the first to stop their work at the signal and assume their duties of helping in the quick and careful return of the tools to their proper place, arranging them in their correct order on the shelves.

All questions arising should be referred to the TOOL FOREMAN.

Tool Checker in the Wood Storage Area (1)

Those whose duty it is to check the tools in the wood storage area should see if any tools are left out of place, returning them to the tool room, and to arrange the clamps that are not in use to their proper place at the glue table.

All questions arising should be referred to the TOOL FOREMAN.

Finishing Equipment Monitor

All finishing equipment should be kept in the cupboard for that purpose in the finishing room. It is the duty of the MONITOR OF THE FINISHING EQUIPMENT to straighten this material, placing all brushes in their respective containers, seeing that all paint and finishing containers have their lids properly pressed down, and wiping out the "used containers" so a scum will not be present upon using it the next time.

All questions arising should be referred to the TOOL FOREMAN.

CLEAN-UP FOREMAN (1)

The CLEAN-UP FOREMAN should observe in every detail that the shop is properly cleaned up, in a careful and quick manner. He should help this process if necessary and fill vacancies caused by absences in his MONITORS' jobs, all the while checking the monitors in their work.

The CLEAN-UP FOREMAN is superior to four MONITORS who are under him.

CLEAN-UP MONITORS

All MONITOR'S duties are for only one week duration at which time a change or release will be posted by the rotation of the Duties Wheel.

Bench Monitors (2)

Both MONITORS for work benches and the power tool bench
are responsible for brushing all pieces, sawdust, shavings and other litter onto the floor. This should be done quickly and any tools that are found while doing this cleaning should be reported immediately to the TOOL FOREMAN.

All other questions arising should be reported to the CLEAN-UP FOREMAN.

**DRAWING ROOM MONITOR (1)**

This MONITOR is to straighten all chairs and stools in the library area and return all materials left out of place to their correct place. The rulers and triangles should be counted if time permits. (12 each) This work should be begun promptly upon the given signal.

All questions arising should be referred to the CLEAN-UP FOREMAN.

**Clean-up Scraps and Wood Storage Area (1)**

This MONITOR is responsible for collecting all large scraps into the scrap box and to return all unused lumber to the lumber rack. The lumber rack should be straightened and not left to be just piled in place, as wide lumber will warp very easily. Kinds of lumber should be returned to its respective shelf.

All questions arising should be referred to the CLEAN-UP FOREMAN.
PUPIL INVENTORY AND PROGRESS FORMS
**Pupil Inventory**

Name: 

Address: 

Phone: 

Year: ___ Grade: ___ Age: ___ Years in School _____

Father's Name: 

Father's Occupation: ____________ Living _____

Mother's Occupation: ____________ Living _____

Number Brothers (older)___ (younger) Number Sisters (older)___ (younger)___

Locker No. ____ Date Entered ____ Date Withdrawn ____

Accidents ____________________________

Field Trips __________________________

Number Periods per week - 1st Sem. _______ 2nd Sem. _______

Remarks ______________________________

<table>
<thead>
<tr>
<th>Social Activities</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abilities, Aptitude</th>
<th>Leisure Time Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment Experience</th>
<th>Vocational Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambitions and Goals</th>
<th>Parental Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Progress Chart**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Project Sheet

<table>
<thead>
<tr>
<th>Area</th>
<th>Date</th>
<th>Description</th>
<th>Db.</th>
<th>Cr.</th>
<th>Student Grad.</th>
<th>Tech Grad.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weekly Schedule

<table>
<thead>
<tr>
<th></th>
<th>1st Sem.</th>
<th>2nd Sem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per.</td>
<td>1 2 3 4 5 6 7</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>Mon.</td>
<td></td>
<td>Mon.</td>
</tr>
<tr>
<td>Tue.</td>
<td></td>
<td>Tue.</td>
</tr>
<tr>
<td>Wed.</td>
<td></td>
<td>Wed.</td>
</tr>
<tr>
<td>Thu.</td>
<td></td>
<td>Thu.</td>
</tr>
<tr>
<td>Fri.</td>
<td></td>
<td>Fri.</td>
</tr>
</tbody>
</table>
VALLEY JUNIOR HIGH SCHOOL
WEST DES MOINES, IOWA

Educational Progress
Report to Parents

Student ____________________________ Grade ______

Home Room ____________________________

The numbers under the subject marked with a zero (0) indicate that much improvement is needed; a check (V) indicates that the condition is satisfactory; and a plus (+) indicates there is marked development.

Explanation of Scholarship Grade

(A) Excellent Grade (D) Below Average Grade
(B) Above Average Grade (I) Incomplete Grade
(C) Average Grade (E) Failing Grade

General Shop ____________________________ Instructor ____________________________

Working Habits

(1) Works with accuracy.
(2) Uses good judgment in his work.
(3) Careful and observing in his work.
(4) Sincere in solving his problems.
(5) Works without wasting time or materials.
(6) Neat and orderly with tools and materials.
(7) Will work at a job until it is finished.

Abilities

(8) Ability to work independently.
(9) Ability to see a problem and the need for a solution to the problem.
(10) Ability to choose the best solution for a problem.
(11) Ability to make and follow plans.
(12) Ability to follow instructions.

Attitudes

(13) Attitudes toward his work, teacher, and classmates.
(14) Attention in class.
(15) Desire to improve.
(16) Handling and care of tools.

Attendance to class.

Scholarship Grade.
PRINCIPLES OF INDUSTRIAL ARTS LABORATORY PLANNING

Prepared by William E. Warner
and Members of the Laboratory Planning Classes

Developed at Ohio State University
PRINCIPLES OF INDUSTRIAL ARTS LABORATORY PLANNING* 

Prepared by William E. Warner 
and Members of the Laboratory Planning Classes 

BASIC CONSIDERATIONS 

A laboratory shall be thought of not only as a place for making projects, but equally as a place for planning, investigating, testing, experimenting, consulting, evaluating, .... In short, the laboratory shall be thought of as a place for thinking as well as feeling and doing. 

Areas Represented. Any basic industrial process or material adaptable to pupil use shall be considered as a suitable and desirable basis for an activity in an Industrial Arts laboratory. Study, investigation, testing, and demonstration should be carried on so as to represent a still greater variety of industries. 

The reference material or library shall be considered as much a part of the laboratory as any tool, machine, or area, and should be provided for and utilized in much the same manner. 

The instructor should have some designated area which includes a desk, typewriter, filing cabinets, etc., preferably located away from noise and dirt, but convenient to the reference and planning center and commanding as full a view of the laboratory as possible. 

An assembly area should be provided as a service to all other centers in the laboratory. This area may well be in common with the space reserved in front of large outside openings where cars and trucks may be driven into the laboratory as needs arise. 

Local limitations such as insufficient space or funds should be met by reducing the number of accommodations in several or all areas rather than by eliminating a complete area. 

Nature of Equipment. The maturity of the pupils who are to use the laboratory should be a guiding factor in the planning of equipment, particularly as regards size, weight, power, capacity, and safety of machine and hand tools. 

Safety factors shall be given first consideration in all laboratory planning. They become paramount in the placing of equipment. Any area shall be visible from every portion of the laboratory. Such points also include: the location of service facilities, the placement of the tool room, the 

*Developed at the Ohio State University
width and location of aisles of travel, and such items as light, color, and acoustical treatment. Machines around which exist zones of danger such as: jointer, bandsaw, hacksaw, lathe, etc., should be so placed as to reduce—or better, eliminate—the possibility of pupils being in line of danger. Such zones should be indicated on the floor by painted lines.

Handling of hot metal in founding, forging, welding, etc., and the operation of hazardous machines such as the circular saw, jointer, lathes, bandsaw, shaper, printing press, paper cutter, etc., shall be isolated from all traffic and distracting interference as far as possible.

Interference. Pupil work stations shall be so placed that interference from adjacent workers and aisle travel will be reduced to a minimum.

Flexibility to meet the challenge of changing programs and pupil needs should be provided for in any laboratory plan and installation. This implies that unassigned floor areas may occur, that large equipment should never be so integral with the building that it cannot be shifted, that individual drives on all machines become a necessity, that an abundance of well-distributed service outlets should be provided, in keeping with the desirability of semi-portable equipment. Expansion and alterations should be anticipated as a means of meeting further demands on floor space by new equipment or areas, larger enrollments, character of the program, etc.

LABORATORY SIZE AND SHAPE

Size of the laboratory shall be determined by the general rule of allowing a minimum floor area of 60 square feet per pupil. This figure includes storage space, tool room, finishing room, dark room, planning room, etc., and is useful for laboratories planned to accommodate twenty-five pupils or more. Due to the necessity of certain fixed items regardless of pupil capacity, the figure of 60 square feet per pupil must be increased proportionally as the classes reduce in size. Laboratories designed for operation by a single teacher should for administrative reasons not exceed 3,000 square feet in floor space.

Shape of the laboratory is most important. It should in general be rectangular and have a proportion of 1 to 1 ½ or 1 to 2. The width should never be less than 30 feet; preferably more. Irregularly shaped laboratories such as the "U", "L", etc., should be avoided as quite unsuited to school needs.

A pupil station is defined as any location in the laboratory where a pupil may be engaged, such as at a bench, a vise,
in the tool center, at a reading table,... Between 50 and 100 per cent more stations should be provided than the maximum number of pupils using the laboratory at any one time.

LABORATORY ARRANGEMENT

Distinct aisles of travel shall be provided between all areas and points of common usage such as storage rooms, tool rooms, and common machine areas. It may be deemed desirable to distinguish these aisles by lines painted on the floor. Areas should be so placed in relation to another that a maximum working relationship exists. For example, areas of founding, forging, and welding have processes and materials in common and should be placed in close proximity to one another. The same might be said of machine metal work, sheet-metal work, automobiles, and electricity as well as photography, printing, bookbinding,...

Cleaning Space. Equipment occupying floor space should always be placed to allow for ease of cleaning around the base.

Tool and supply centers should be as centrally located as possible to reduce traffic and traffic interference to a minimum. Tool areas located in the center of the laboratory are probably ideal in this respect if they do not obstruct vision in the laboratory. Long narrow rooms are not adapted to the central location of a tool area. The best thing to do in these cases is to place it against the wall in the middle of the long side. Laboratories more nearly square in shape may develop a tool area only counter-high without upper screening as an excellent solution. Certain large pieces of equipment such as attachments peculiar to some one machine might well be placed adjacent to the machine on a small panel. This practice reduces traffic and demands at the tool room, which will make for less confusion and better laboratory administration. Certain small tools peculiar to a single area may well be stored and distributed in kit form to reduce tool-room service to a minimum and speed up handling. This treatment is particularly adaptable to: foundry, machine lathe, wood lathe, automobiles, ceramics, and drawing.

Sequence of Operations. Certain machines should be arranged with reference to sequence of operations and their relationship to other areas. The jointer is usually placed to the right and rear of the circular saw, but close to it, since these machines are frequently used alternately. The circular saw should be placed opposite lumber storage space to reduce the disturbance and danger of handling long lengths in the shop. Further attention should be given in placement of machines to assure adequate clearance for the work to be done.
AUXILIARY FACILITIES

Storage and supplies for all areas may well be concentrated in a single storage room for ease of administration and control. No space, shelving, flat surfaces, etc., should ever be provided for storage unless some specific article or material is assigned to it. A place for nothing in particular is a place for everything in general, and anything belonging in the laboratory should have an assigned place.

Rough Trimming. Power hack saw, paper cutter, hand saw, tin snips, or squaring shears, saw horses, and other equipment used to prepare stock to size might well be located permanently in the stock room. Such practice avoids the unnecessary hazard of handling large and awkward sizes of stock in the work areas of the laboratory and eliminates the problem of returning unused pieces.

Racks and shelving should be provided for the orderly storage of all materials including lumber, sheet metal, steel, paper, hardware, etc. Project storage, on the other hand, may be provided elsewhere to care for partially completed and finished pieces. Such storage space should be designed to protect the pieces stored.

Student lockers, for administrative reasons, are best distributed about the laboratory rather than concentrated in a single area. Ganging and crowding is thus avoided. The pupils immediately scatter on entering. For purposes of economy of space, these lockers should be placed under bench tops where they become the bench body itself, thus serving a dual purpose. Distribution of lockers throughout the room is well provided for by this method.

ARCHITECTURAL AND SERVICE CONSIDERATIONS

An outside entrance should be provided large enough to admit an automobile or truck. The area at this door opening may well be utilized as a fabricating area for the sake of space conservation.

Exhibits. Lighted exhibit and display cases are highly desirable and should occur both in the laboratory itself and in central locations, probably main corridors, in the principal part of the building.

Bulletin boards shall be considered essential to the laboratory. One or more general bulletin boards should be placed in central positions such as the entrance to the laboratory and near the tool center. In addition to general bulletin boards, it is considered desirable to have a small board mounted near or in each work area. Post and small wall sections may well be utilized in this manner. Wall space for permanent displays and a daylight projection screen should
be provided. Blackboard space in several or all areas is considered advantageous. Extensive blackboard as well as bulletin-board space in the planning area is quite essential.

Utilities. Gas, water, electricity and compressed air should be thought of as essential utilities for every Industrial Arts laboratory. A general distribution of outlets, particularly the electrical, should be provided.

Washing. A sufficient number of washing facilities should be provided in the laboratory proper to allow a washing position for each ten pupils in the class.

Toilet facilities should be provided in connection with the laboratory or at least accessible nearby.

Natural light shall be thought of as desirable and advantageous, though not dependable because variable. (See Artificial Light below.) Precision equipment such as machine lathes, milling machines, drill presses, circular saws, jointers, jig saws, wood lathes, grinders, drawing tables, etc., should probably be given preference in location with reference to natural light. Certain operations such as clay modeling, wood carving, and finishing are more effectively carried on under natural light because of the need for sensitive light and shade definition and delicate color discrimination. Natural light is best controlled by means of venetian blinds of light color and flat finish. The direction of the light source must be given careful attention in the placement of all equipment. Working positions directly facing windows are generally not satisfactory, with the possible exception of bench work. Even this practice may be objectionable along east, south, and west elevations.

Artificial light should supplement natural lighting to the extent that the artificial light alone will provide illumination that conforms with good lighting practice. Good general lighting shall be provided to an intensity of at least 20 foot candles at bench height in all areas and this shall be supplemented with additional local lighting on all machines and areas where precision work is carried on. In no case should a bare lamp bulb ever be visible. The surface of radiation from any light source should be as large as possible to reduce surface brightness—and hence glare—to a minimum.

Paint for walls, ceiling, and equipment should be semi-gloss of a good reflective and diffusing value selected in harmonious and pleasing colors artistically treated in a simple manner. Glossy surfaces on benches, machines, walls, etc., are to be avoided because of the glare they produce.

Power and light controls should be centralized on a control
panel conveniently located in the laboratory. The tool
room, if one is used, serves well as a central control for
both power and light.

The ventilation system for the laboratory should be separate
and distinct from the rest of the building for mutual benefit.
A circulating washed air system for the laboratory would
be most desirable from the point of view of health and mainte-
ance. All excessive heat and fumes should be cared for
by ventilating the areas involved by means of hoods and
exhaust systems. Flues should be provided through which
all gases may be carried to the roof. Separate flues for
the finishing area and heating units are necessary.

Dust and refuse collecting systems piped below the floor are
to be considered highly desirable.

Heating units should be placed so as to avoid occupying
useful space and interference with operations. This suggests
the consideration of recessed units or units suspended from
the walls or ceiling.

Acoustical treatment is considered a necessity in all Indus-
trial Arts laboratories. Both walls and ceilings should be
so treated. A minimum treatment would at least provide for
celling absorption of not less than 50 per cent. Maximum
absorption possible is deemed desirable especially if a
celling treatment alone is used. (See also below.)

Floor materials shall be suitable to the area in which they
are used. Wooden floors, probably maple or blocks-on-end,
is deemed most suitable at present for all areas except those
dealing with hot metals; namely foundry, forging, and weld-
ing. Here the floor may well be concrete, flush with the
wooden floor or a wooden floor covered with rough-surfaced
steel plate. Sound-proofing below the wood flooring is to be
recommended regardless of the location in the building.
Rubber mat floor covering should be used as a safety pre-
caution where machine operators stand. This is particularly
important on smooth and slippery floors.

Walls, from the floor up to a point of five feet, should be
surfaced with some durable material easily cleaned and of a
pleasing texture and color. Mat glazed brick, tile, formica
micarda, enameled 1/8-inch premtwood, asbestos, tile, or
vitralite is satisfactory. Above this point walls should
be plastered or treated with a sound-absorbing material.

Ceilings should be not less than twelve feet in height, and
all laboratories should be ceiled with a material of a high
coefficient of absorption—not less than fifty per cent.

Partitions, preferably of glass and steel, are desirable and
Industrial Arts Laboratory Planning

essential for certain areas in the laboratory. Ideally, the maximum integration probably takes place where no partitions exist; thus in practice partitions when used should preserve as far as possible the unity of the laboratory by maintaining maximum visibility between the areas. This implies a 42-inch steel partition, the remainder being glazed to the ceiling.

See also the reference by Dr. William E. Warner in Bruce's School Shop Annual for February, 1934.
PRINCIPLES OF INDUSTRIAL ARTS EQUIPMENT SELECTION

Prepared by Elroy W. Bollinger
and Members of the Laboratory Planning Class

Developed at the Ohio State University
PRINCIPLES OF INDUSTRIAL ARTS EQUIPMENT SELECTION*

Prepared by Elroy W. Bollinger and Members of the Laboratory Planning Class

The obvious basis for Industrial Arts equipment selection is the educational program which is to be achieved through its use. Cost, as such, is but a negative consideration at best and should be considered only after the program has been fully projected.

Each tool, each machine, each bench, and each piece of apparatus must provide for a maximum of pupil participation in its use. In other words, mere pressing of a button to perform an operation defeats learning. In addition to this, each item of equipment must represent a basic industrial process. It is only through an understanding of these processes and their effects that the pupil is enabled to interpret the infinite number of applications so characteristic of American life. Learning through experience for purposes of orientation in an industrial society requires a variety of equipment rather than a duplication of specialized items.

Safety is secondary only to educational criteria. This means that all equipment must be designed and built, and in turn selected and used, with specific reference to the size, height, strength, mental development, and experience of the individuals who are to use it. Thus the capacity, weight, power, speed, and size of machines for Industrial Arts classes should be determined by the nature of the pupils who use them.

Obsolescence is also a factor which Industrial Arts programs and school officials must learn to recognize and face. American industry "retools" periodically for a world where change is the only certainty. The school is faced by the same certainty. The equipment manufacturer is now producing less costly equipment of smarter design to encourage periodic replacement. But, the Industrial Arts program of today finds itself equipped, in effect, with horses and buggies in an age of complex machine transportation. If American people want their children to cope successfully with such an age, then the lessons for equipment selection seem to be most plain.

FUNCTIONAL FEATURES

1. Machines should be of the unit type in order to provide maximum efficiency, safety, and flexibility of arrangement. Combining a circular saw, mortiser, and jointer

* Developed at the Ohio State University.
Industrial Arts Equipment Selection

on a single standard reduces the usefulness and efficiency of each machine besides resulting in unnecessary interference and hazards.

2. Machines should be designed and used for only one type of work. The drill press, for example, which is in such constant demand, should not be expected to serve as a router, a shaper, a sander, and a hollow-chisel mortiser in addition to its principal function of drilling.

3. Automatic feed and control devices obscuring the principles of a machine should be avoided for Industrial Arts classes except for reasons of safety. Automatic feeds on mortising machines and drill presses, quick gear changes on lathes, and automatic press feeders are cases in point.

4. Machines should be mounted on individual bases, preferably enclosed on all sides to the floor to facilitate cleaning both machine and floor. A machine mounted on a bench destroys in part the usefulness of both bench and machine.

5. The equipment provided in a laboratory should be of a size or capacity which will take care of the bulk, but not necessarily all, of the work which anyone would like to do. For example, there may be a distinct educational value in having a pupil himself take some work directly to an industrial shop or plant, where he will make new contacts, observe industrial methods, evaluate production costs, note merchandising procedures, and experience being handled as a customer.

SAFETY FEATURES

6. Essential safety features such as circular saw guards, jointer guards, pulley and belt guards, should be designed and supplied as an integral and not as a separate item of equipment.

7. All moving part of power-driven machines must be guarded of enclosed except those used directly in the operation involved.

8. All hand-operated machines that present hazards such as squaring shears, punch presses, paper cutters, etc., shall be provided with effective guards.

9. All moving parts of motor-driven equipment, whether guarded or not, should be free of projects such as set-screws, knobs, keys, etc.

10. Guards, when used, must be simple in design, positive in action, and interfere as little as possible with the
operation of the machine. Guards that adjust themselves automatically to the work being done are to be preferred over manual types.

11. All grinding equipment should be provided with shields of laminated safety glass.

12. All motors should be equipped with overload protective devices of the thermal-relay or circuit-breaker type. These devices should be incorporated in the case with the motor switch control.

13. The size, capacity, and power of any machine shall be determined with reference to the age, strength, height, and mentality of the pupils who are to operate it. It is questionable, for example, if any machine in a junior high school laboratory need be driven with a motor exceeding one horse power.

**DESIGN FEATURES**

14. The average elbow height of individuals who are to use a bench or machine shall be the reference point in specifying the operation level of said bench or machine.

15. All machine tools should have individual motor drives, controls, and stands.

16. Power for any machine should be adequate to operate the equipment under its full rated capacity without unreasonable overloading of the motor.

17. "V" type belts are usually to be preferred to flat belts from the standpoint of power transmission and general efficiency. Flat belts, if used, should be of the endless type and may be preferred as a protective measure because of slippage on excessive overloads. This is particularly true where machines may be locked by jamming, as in the case of an engine lathe or milling machine.

18. All reciprocating or revolving machine parts that work at high speeds should be balanced and counterbalanced to reduce vibration to a minimum.

19. Machine standards should be sturdy and rigid in order to provide a solid base free from weaving and twisting for the machine it supports. Cast iron bases are usually superior in this respect and to be preferred over the assembled angle iron type.

20. All handles, wheels, and mechanical controls shall be of easy access to the operator, arranged not to interfere
with each other, and be electroplated with an anti-corrosive metal.

21. Speed controls should be convenient, safe, positive, and of a range sufficient for the work for which the machine was designed and the experience level of the operator; e.g., beginning printing press operators require an unusually slow press speed.

22. The use of detached knobs, wrenches, etc., for adjusting and operating a machine should be avoided as far as possible.

23. Machine parts such as saw blades, drill spindles, mortiser bits, etc., should be easily and quickly adjusted and interchanged without damage to the parts.

24. Machines might well include housing space for extra parts and attachments that are used exclusively with that machine; e.g., woodturning lathes should have some provision for holding the turning tools convenient to the operator and designed as an integral part of the machine.

25. Machine or cabinet bases shall not interfere with the movements or comfort of the operator; e.g., toe room shall be always considered in the design.

26. Machines shall be designed to allow the maximum amount of working space around the point of operation.

27. Power machines should be provided with switches placed within the operator's natural reach and vision while the machine is in operation but so located that accidental switching is avoided.

28. Motor-driven machines of one horse power or less shall be equipped with a toggle or push-button type switch operating in a vertical position and placed within natural reach of the operator.

29. The quality and kind of materials used in the construction of machines for school use shall be comparable to that used in machines for industry.

30. Sealed roller or ball bearings shall usually be considered preferable to other types of bearing.

31. Collectors for shavings, dust, etc., shall be an integral part of the machine. The machine shall, however, lend itself to installation of a central dust-collecting system.

32. Where possible motors shall be housed within the machine, but made easily accessible for maintenance.
33. Flexible molded rubber power cords should be supplied and used in connection with all portable and semi-portable equipment.

34. The need for periodic lubrication should be reduced to a minimum through such means as sealed bearings packed in grease or oil. Parts needing periodic lubrication should be fitted with snap-cover oil cups or alemite zerk fittings located for ease of identification and servicing.

35. Machines shall be designed to operate with a minimum noise factor and cushioned preferably with rubber mountings furnished as an integral part of the machine.

37. Machines embodying sheet-metal construction should be treated with a noise-absorbing or dampening medium glued or sprayed on inside metal surfaces.

38. Machines should be painted a distinctive color sufficiently light to have a light-reflection factor of at least 40, free from objectionable glare, easy to clean, and of neat appearance.

39. "Local" lighting incorporated as an integral part of machines is desirable.

40. Simplicity of construction and design and ease of maintenance shall be considered desirable in all equipment.
EXAMPLES: INDUSTRIAL ARTS EQUIPMENT SPECIFICATIONS

A Committee Release for the State of Ohio
10" Tilting Arbor Saw

July 1939

10" geared or belted drive tilting Arbor Saw, Walker-Turner or equal.... Capacity using 10" blade to be at least 3". Speed of blade approximately 3500 r.p.m. Motor to be not less than 1 h.p. ___ phase, ___ volt, ___ type. Arbor spindle mounted on two dust sealed ball bearings. Saw arbor must be at least 5/8" in diameter equipped with flange washer and 5/8" diameter left hand acme nut. Dado capacity of arbor to be at least 13/16". Saw to be adjustable to at least 3" vertically and to tilt 45°. Tilting screw must be mounted on self-aligning ball bearing for easy operation. Positive stops must be provided at 45° and 90° positions. Tilting lock to be of the clamp type. Steel worm gear and pinion to operate elevating mechanism. Graduated scale to show degree of tilt and depth of cut. Box-type floor base, preferably of heavy cast iron closed to floor, fully enclosing saw arbor and motor assembly. Hand holes to be provided in base for access to saw blade and removal of saw dust. Table to be of cast iron at least 20" by 27". Cast iron extension tables to be available to increase table size to 27" by 36". Table must have miter gauge slot on each side of saw blade. Soft metal throat insert to be provided, must be interchangeable with dado insert. Rip fence must be at least 28" long and 2¾" high to be so designed as to permit use on either side of the saw blade and equipped with a micrometer adjustment. Rip fence support bar to be graduated in inches. Miter gauge must be of the self-indexing type adjustable to 45° in either direction. Guard and splitter to be furnished as accessories. Must be equipped with anti-kick back pawls and splitter. Shipping weight to be at least 380 pounds.
INDUSTRIAL ARTS EQUIPMENT SPECIFICATIONS

A State Committee Release
for Ohio Installations

Machine Lathe

July 1939

LeBlond "Regal" Lathe or equal. R. K. LeBlond Mechanical Tool Company, Cincinnati, Ohio.

The machine lathe shall be a floor type machine complete with motor mounted on, or in, the leg, fully enclosed, quick gear change, 8 speed geared head, motor drive with the following specifications:

- Swing over ways 10"
- Maximum distance between centers 24"
- Spindle speed range 30-525 r.p.m.
- Number feeds 48
- Feeds, range, thousandths per inch per revolution .0025 to .144
- Lead screw diameter 3/4"
- Compound rest travel 2"
- Power feed to carriage and cross feed
- Equipped with both lead screw and feed rod, the lead screw being used exclusively for screw cutting.

All to be equipped with large face plate, small driving plate, graduated compound rest, steady rest, tool post, collar and wedge, taper spindle sleeve, follow rest, centers and necessary wrenches, motor and bolt, motor to be 1/2 h.p., 110/220 v., 3 phase, repulsion-induction type complete with control for starting, stopping and reversing the motor located convenient to the operator.
INDUSTRIAL ARTS EQUIPMENT SPECIFICATIONS

A State Committee Release
for Ohio Installations

Warner Type Woodworking Bench

July 1939

Double woodworking bench bodies, each 36" wide face, 42" deep, and 30" high. Bodies to be Lyon Metal Products Company or equal, of sheet steel, with rolled angle legs 12" c.c., provided with 6 locker compartments, each face front and rear, 12" by 15" by 21", with closed base. Lockers to be provided with louvred doors hung on double-loop tight-pin spring (self-closing) hinges, provided with knobs, padlock eyes, and brass number plates numbered in series from 1 up, to suit the requirements of the installation. Top to be punched for attaching edge-grain maple dressed but unfinished top 2½" by 4½" by 5½", furnished and installed with this contract.
INDUSTRIAL ARTS EQUIPMENT SPECIFICATIONS

A State Committee Release
for Ohio Installations

Drill Press

July 1939

The outfit to include: 1 floor model type drill press, 1 head, 1 table, 1 base, 1 motor, 1 speed attachment, 1 Jacobs chuck, 1 ground steel column, 1 motor, pulley, and switch.

Column or shaft: The column or shaft should be of a single type, solid or tubular steel not less than 3½" in diameter, ground smooth and accurate to size.

Head, table, and base: The head and table should be adjustable the full working length of the column by means of rack and pinion mechanism. The table should swing to either side sufficient to clear the drill, tilting to at least 45 degrees either way with positive locks at the 90 and 45 degree positions. Graduated scale for the table is desirable. Table size not less than 10" x 10". The base should be grounded.

Spindle: The spindle should be fully enclosed yet removable for repair, at least 5/8" diameter and doubled splined, free floating within the quill and spindle pulley, operating on at least three sealed, oilless, roller bearings. The travel to be at least 4" and provided with a locking device and adjusting stops or collars. One spindle accommodating various type chucks and attachments, with collar adjustment for taking up and play, with adjustable tension spring return attached to the spindle. The spindle shall have not less than five possible speeds ranging from approximately 400 r.p.m. to 2500 r.p.m.

Feed wheel: The feed wheel should be of the pilot type with at least three nobbed spokes, preferably four.

Clearances: The radial distance between the center of the chuck and the edge of the shaft should not be less than 8". The vertical clearance between the table and the chuck jaws should not be less than 42".

Chuck: The chuck should be a Jacobs keyed type, 0"-17/32" capacity.

Motor: The motor shall be a 1/3 h.p. _____ phase, _____ volt, _____ type, complete with pulleys, belt, and switch, as specified elsewhere.
Acetylene Welding and Cutting Outfit

Outfit to include: 1 welding torch, 1 mixing head, 4 welding tips as selected, 1 light duty acetylene regulator, 1 light duty oxygen regulator, 25 ft. welding hose, 1 wrench, 1 spark lighter, 1 pair welding goggles, 1 cutting attachment tip as selected, 3 pairs welding specs. All to be approved by the underwriters' laboratory.

Welding Torch: The welding torch shall not weigh more than 14 oz. or be longer than 13" with the smallest tip, nor shall it weigh more than 17 oz. or be longer than 18" with the largest tip. It shall have a ribbed handle with wheel type valve controls. The valves shall be of stainless steel ball-seat type or monel metal cone shape type. The torch shall have a capacity of welding satisfactorily, mild sheet steel from 20 gauge up to ½". One mixing head shall operate effectively over this entire range of work.

Tips: The tips shall be of hard drawn copper tubing, swaged type, drilled by standard wire size drills.

Regulators: The regulators shall be equipped with glass wool filters, reinforced rubber diaphragms and automatic safety relay valves for releasing abnormal pressures. The acetylene regulator shall be equipped with two 2½" diameter brass gauges, one maximum capacity 30 lbs., one maximum capacity 400 lbs. The oxygen regulator shall be equipped with two 2½" diameter brass gauges, one with a capacity of 200 lbs., and one with a capacity of 3000 lbs.

Cutting Attachment: The cutting attachment shall have a capacity up to ¾", shall operate from the torch handle, and have its own built-in mixing valve. The cutting tip shall be brass or copper, drilled with 4 pre-heating holes and one high-pressure oxygen hole. This tip shall have two gas-tight seats.

Hose: The hose shall be corrugated single braid 3/16" inside diameter, 12½ ft. of red colored hose for acetylene and 12½ ft. of green colored hose for oxygen. These hose shall be fitted with glands and nuts with ferrules ready to attach to torch and regulators.

Spark Lighter: The spark lighter shall be of the genuine round file type with easily replaceable files and tips.
Wrench: The wrench shall fit all movable connections of the outfit.
Goggles and Specs: Goggles and specs shall contain genuine NoviWeld lenses fitted with clear covered glass, conforming to U. S. Navy Department specifications.

*All available welding outfits were inspected prior to the writing of this specification. We find the outfit most nearly complying with our specifications to be the Air-Co No. 9900, manufactured by the Air Reduction Sales Co., 529 E. Town St., Columbus, Ohio.*