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A Course Study For Two Years of Woodwork In Class "B" and "C" High Schools of Kansas

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A COURSE OF STUDY FOR TWO YEARS OF WOODWORK IN CLASS "B" AND "C" HIGH SCHOOLS OF KANSAS

being

A Thesis presented to the Graduate Faculty of the Fort Hays Kansas State College in partial fulfillment of the requirements for the Degree of Master of Science

by

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CHAPTER I

Introduction

If one were to examine the average small high school designated as class "B" or "C" in Kansas and study its industrial arts department, he would find the school very much handicapped by lack of room and equipment in offering a very extensive course in industrial arts. The rooms devoted to industrial art's use are in most cases too small and often are old class rooms which are very unsuitable for industrial arts. The equipment in the largest per cent of the schools consists of woodworking equipment only.

The writer, in his several years of teaching industrial arts and in his contact with other instructors, has found that the demand for a course of study in Kansas is great. Very few of the smaller schools are using a course of study in woodwork. Most of them are using a course of study made up by the instructor.

The desirability of other courses in industrial arts such as auto mechanics and machine shop practice, printing, metal work, and electricity is stressed by leading industrial arts educators. The value of these

courses is not questioned. The need and demand for a course of study in woodwork is the main consideration of this thesis.

It is impossible to train the students to a very large degree for industrial fitness in these schools because of lack of room and equipment to offer courses other than woodwork that are valuable in industrial training. The training the students will get will be the understanding of modern industries, constructive thinking, resourcefulness, and the training of hand and eye. It is hoped that this course of study will be of such nature and quality that schools offering woodwork will find it useful and beneficial to them.

It is the writer's purpose to build a course of study that will be of value to the schools offering woodwork. At the present time there are only a few instructors who are using the State Course of Study and about fifty per cent who are using no course of study at all. The rest are using courses of study of their own make, and the most of these are unwritten.

This course of study will be built around the text books now being used and the equipment available in these schools so as to be of the greatest value to them.

The term "two years of woodworking " is so used

because some schools give woodwork in the first two years, others in the second and third year, while still others give woodwork two years, and this is open to any student in school no matter what year of school he may be in. Due to the fact that very few schools offer woodwork in the junior high school, or more than one or two years in high school, the writer will not attempt to cover more than two years of woodwork.

Method of Procedure

Questionnaires were sent to superintendents and principals of three hundred and seventy-five class "B" and "C" high schools of Kansas to determine the needs of the schools, the available equipment in the schools, text books used, reference books used, courses of study used, if any, and the amount of woodwork offered and in what grades it was being offered.

Courses of study were obtained from a few of the instructors in these schools. Due to the fact that very few were using a course of study, this source of material was very limited. Courses of study were obtained from some of the class "A" schools in Kansas. Copies from all of them were not available. Several

courses of study for woodwork were obtained from other states.

This thesis was built upon the results taken from the questionnaires, in an attempt to make the course of study fit the largest per cent of the text books now in use and also to keep within range of the equipment available in the majority of the school shops.

The questionnaires were prepared and sent out at the rate of fifty per week. These letters were mailed on Monday of each week, so that they would reach the executives of the schools in the middle of the week; hence they would have a little more time to consider and answer them than if they had received them either at the beginning or the close of the week. One month after the last questionnaires were mailed, reminder cards were sent to those who had not returned the questionnaire by that time. In some instances, another questionnaire was mailed to those who had misplaced or lost the first one.

The text books that were most commonly used in these schools were carefully reviewed and used for the basis of the course of study. These text books and reference books that are now in the schools were used to refer to, in the course of study, so that the instructors could use the material already on hand.

The objectives for woodwork were taken from a list compiled by a committee, made up of leading Industrial Education men in the United States, under the supervision of the American Vocational Association.

Three other studies, on the subject of woodwork courses of studies, were reviewed: (1) Darnall W. Morrison's master's thesis, "Eighteen Weeks Course in Beginning Woodwork," written at the University of Tennessee in 1936. This thesis includes a brief history of industrial arts education, analyzes twenty-five courses of study, and compares fifteen courses of study in beginning woodwork with standards of attainment of the American Vocational Association. (2) Ermon Boyd's master's thesis, "Present Practices in Making Industrial Arts Courses of Study", written at Oklahoma A & M College in 1935. This thesis analyzes 177 courses of study in industrial arts and suggests a form for courses of study. (3) Jesse Earl Rathburn's master's thesis "A Course of Study for Bench Woodwork," written at Leland Stanford University.

This thesis is justified by the fact that no other thesis could be found that covered the same amount of work: "Two Years of Woodwork". One of the previous studies made, "Eighteen Weeks Course in Beginning Woodwork", was constructed for one semester's

work in the junior high school. The second previous study reviewed consisted of an analysis of the present practices of making courses of study. The third study reviewed consisted of a course of study for beginning bench woodwork, without regard to grade or length of time to be devoted to woodwork.

The course of study in this thesis was built to include two years of woodwork. It was constructed with the aim of making it of some value to the schools with their present equipment of books, magazines, and machinery.

There has been no endeavor made to make a course of study which includes information on woodworking, such as one would find in a text book. The sole purpose of this course of study is to act as an outline to be followed through a two-year course of woodwork. The course of study gives only the source of information for the processes deemed necessary for woodworking.

CHAPTER II

Presentation of Data

Part I The Questionnaire

In order to obtain a basis for the course of study, a questionnaire was sent out to the schools classified as "B" and "C" in Kansas. This questionnaire was for the purpose of finding the present needs of the schools, such as: text books, reference books, equipment now available, need for a course of study, number of years that woodwork was offered, length of periods, and general comments from the industrial arts instructors.

In part I of this chapter is presented the questionnaire that was used and the letter that accompanied the questionnaire. The follow-up card was sent to those who had not answered within 30 days after the questionnaires had been sent. In part II the data from the questionnaire are assembled and analyzed in table form.

A Survey of the Industrial Arts
Departments in Class "B" and "C"
High Schools of Kansas

Part a.
Name.....Address.....

Position.....

Name of text books in woodwork which you are now using.

1. _____ (7th & 8th grade)

2. _____ (1st year woodwork)

3. _____ (2nd year woodwork)

4. _____ (3rd year woodwork)

5. _____ (4th year woodwork)

Name of reference books which you use for woodwork.

1. _____

2. _____

3. _____

4. _____

Part b.

Course Of Study

What course of study are you now using in woodwork?

Name of course.....Date published.....

Is the course of study you are using of your own making?.....

How many pages in length is it?.....

Is it in specific detail or general suggestions?....

.....

Would you care to cooperate in this study by sending me a copy?.....

If you are using a course of study not of your own making, what are its weaknesses?.....

.....

Are you offering any upholstering work in direct connection with your classwork in woodwork?.....

.....

Do you have sufficient equipment for this work?.....

.....

Part c.

Equipment

Check with an x the power machinery which you have in your shop.

Jointer		Circle saw	
Jig saw		Turning lathe	
Band saw		Shaper	
Press drill		Emery Wheel	
Planer		Sander	
Other power machines			

The following table gives some of the common needs of an industrial arts department. Will you please number these needs in 1,2,3, etc., order

according to your most urgent needs in your shop? (For example, if you consider magazines the most important of your present needs number it 1.) Number as many as come under your present shop needs.

Project plans		Source books	
Text books		Magazines	
Finishing rooms		Larger shop	
Power Machinery		General hand tools	
Indiv. hand tools		Work benches	
Other needs			

Part d.

Courses Now Offered

Industrial arts courses offered in your high school.

Name of course	Number pupils	Semesters offered	Which grade	No. periods per week	Length of per.

Additional Suggestions and Comment

.....

.....

.....

.....

.....

.....

Would you like to have a summary of the results of this study?.....

Thank You

Following is a copy of the letter that accompanied each questionnaire.

Cimarron, Kansas
March 1, 1938

Mr. Clay Brown
Principal of High School
Cedar, Kansas

Dear Mr. Brown:

For some time the writer has been a teacher of Industrial Arts in the high schools of the state. Most of the time has been in industrial arts departments in class "B" and "C" high schools. During this time he has found that there is no prescribed course of study in woodwork for the schools of Kansas. He has also found that the need for one is very great in the smaller schools.

More and more, the writer has given thoughtful consideration to this problem of a course of study in woodwork. He is interested to the extent of

thoroughly studying the problem, and plans to work out such a course for the high schools of class "B" and "C".

I would like to have your participation in this project to the extent of giving the information on the questionnaire. If there are any suggestions or other information which you believe would add to the study, I will appreciate having your suggestions.

I will appreciate it very much if you can fill our this questionnaire and return it to me in the near future if it doesn't inconvenience you too much or take too much of your time.

Yours very truly,

Wayne C. Jacka
Industrial Arts Instructor

Following is a copy of the "Reminder card" sent one month after all questionnaires were sent out. These cards were sent to all schools that had not answered the questionnaire by that time.

Just a Reminder

Cimarron, Kansas
April 1, 1938

Dear Mr. Prather:

Some time ago I sent you a questionnaire. Up to this time I have not received your answer. I really need your questionnaire to make my survey complete. Will you please fill in your questionnaire and return it as soon as possible?

Respectfully yours,

Wayne C. Jacka

Part II

Data Obtained From Questionnaire

Part a.

The following tables give the results obtained from the 111 schools that returned their questionnaires and are offering woodwork.

Table I. The text books now being used in class "B" and "C" high schools in Kansas.

Name of text book being used	Number of schools using this book
Instruction & Information Units for Hand Woodworking	54
Principles of Woodwork	11
Prevocational and Industrial Arts	7
Essentials in Woodwork	3
A Woodworking Manual	3
Shop Projects and Community Problems	1
School and Home Shopwork	1
Basic Woodworking Processes	1
Practical Problems in Woodworking	1
No text Book	2

Table I shows that there are only 76 schools using text books, and 35 not using a text book. In the

following course of study the five leading text books will be used to help determine the content of the course. These books are used because they are already in the schools and are more apt to be used in following a course of study than if new books are called for. The present trend is toward the use of text books in woodworking but at the present time, as shown by table I, only 68.4 per cent of the schools covered in this study are using text books.

Table II. Reference books now available in class "B" and "C" high schools in Kansas.

Name of reference book	Author	Number of schools using this book
Principles of Woodworking	Hjorth	28
Essentials of Woodwork	Griffith	21
Modern Projects in Woodwork	Douglas & Roberts	19
Prevocational and Industrial Arts	Wood & Smith	15
Instructional Units in Wood Finishing	McGee & Brown	9
A Course in Wood Turning	Milton & Wohler	8
Wood Finishing	Jeffery	8
Handwork in Wood	Noyes	7
100 Problems in Woodwork	DeVette	7
Basic Woodworking Processes	Hjorth	7
Instructional & Informational Units	Brown & Tustison	7

Wood and Forest--Noyes	7
Projects in Woodworking--Adams	6
Instruction and Information Units--Douglas & Roberts	6
Furniture Boys Like to Build--Shaver	5
Woodwork Manual--Boone	5
A Manual for Hand Woodworking--Dewitt & Hunt	5
Problems in Artistic Wood Turning--Ensinger	4
Selected Furniture Drawings--Klenke	3
Educational Woodwork--Park	2
Problems in Wood Turning--Crawshaw	2
Wood and Lumber--Newell	2
Essentials of Upholstering--Bast	2
Machine Woodworking--Hjorth	2
Design and Construction in Wood--Noyes	2
Tool Processes--Laughlin	1
Problems of the Finishing Room--Schmidt	1
Beginning Woodwork--Seldon	1
No reference books	22

Table II gives the reference books available in the high schools at the present time. These reference books, combined with the text books now in use in these

schools, will form the basis for the references under each operation in the course of study.

Instructional and Informational Units for Hand Woodworking by Douglas and Roberts is leading with 54 schools using it as a text book. This same book ranks eighth in the number of copies used, in the list of reference books. Principles of Woodwork by Herman Hjorth ranks second as a text book, and first in the reference list with 28 using it as a reference. Prevocational and Industrial Arts by Wood and Smith ranks third on the text book list with seven schools using it, and fourth on the reference list with 15 schools using it as a reference book. Essentials in Woodwork by Griffith is fourth in use as a text book with three schools using it, but it ranks second in the reference book list with 21 schools using it as a reference. A Woodworking Manual by Boone ranks fifth as a text book with three schools using it, and ranks fifteenth as a reference book with five schools using it for reference.

Other leading reference books listed in the reference book list which the course of study contained are: Instructional Units in Wood Finishing by McGee and Brown. It was used by nine schools as a reference

book. This book and the books that follow are of such nature, dealing with only one phase of woodwork, that they could not be used as text books, but are very essential as reference books. A Course in Wood Turning by Milton and Wohler ranked sixth as a reference book with eight schools using it. Handwork in Wood by William Noyes ranked seventh with seven schools using it as a reference book. Instructional Units in Wood Finishing by Brown and Tustison also ranked seventh with seven schools using it. Wood and Forest by William Noyes is also used by seven schools as a reference book. Educational Woodwork by Park, Problems in Wood Turning by Crawshaw, Wood and Lumber by Newell, Essentials of Upholstery by East, Machine Woodworking by Hjorth, and Design and Construction in Wood by William Noyes ranked twelfth with only two schools using each of them as reference books. There are 22 schools that do not have access to reference books in woodwork.

The following books have been selected from the text book list and the reference books on the basis of the number of schools now using them in Kansas:

Instructional and Informational Units in Hand Woodworking---Douglas and Roberts.

Principles of Woodwork----Hjorth.

Prevocational and Industrial Arts--Wood & Smith

Essentials in Woodwork---Griffith.

Instructional Units in Wood Finishing--
McGee and Brown.

A Course in Wood Turning--Milton & Wohler.

Handwork in Wood--Noyes.

Instructional Units in Wood Finishing--
Brown & Tustison.

Wood and Forests--Noyes.

Educational Woodwork--Park.

Problems in Wood Turning--Crawshaw.

Wood and Lumber--Newell.

Essentials of Upholstery--Bast.

Instructional Units in Hans Woodwork--
Brown & Tustison

Machine Woodworking--Hjorth.

Design and Construction in Wood--Noyes

Beginning Woodwork--Van Deusen.

Part b.

The following tables give the result of part b of the questionnaire.

Table III. Courses of study being used at the present time in the class "B" and "C" high schools of Kansas.

The course of study now being used	Number of schools using this course
State Course of Study for Kansas	11
Course of study made by instructor	56
Text books used as a course of study	6
No course of study used	38

Out of the 56 courses of study made by the instructors, there were thirty that were not written down. The instructors were relying upon memory alone to cover all the necessary items in a well rounded course in woodwork. Out of the 42 instructors who stated whether their course was of general or specific nature there were 34 who reported that their course was too general to be of great value to them.

With the courses of study varying so much, it will be impossible ever to standardize a wood working test. From the results shown in table III, one can readily see the need for a course of study in woodwork that can be used by all high schools in class "B" and "C". Pupils going from one school to another with some credit in woodwork cannot step in with the regular classes and do satisfactory work because of the varied courses offered over the state in different schools.

Table IV. The amount of upholstering being offered and amount of equipment available for such work.

Upholstering and equipment	Number of schools
Offering some upholstering	66
Offering no upholstering	45
Having sufficient equipment	22
Having insufficient equipment	44

In these schools upholstering was offered only when the demand came from a student working on a project which required some form of upholstering to complete the project. No school reported teaching a separate unit on upholstering. Upholstering is a very essential part of woodwork because of the many projects which require some form of upholstering and because of the refinishing and upholstering jobs that come from the pupils' homes. Due to the number of schools that offer some upholstering and due to the demand for upholstering in the shops, some of the simplest upholstering operations will be included in this study.

Part c.

The following tables will give the results of the findings on part c. of the questionnaire.

Table V. Power equipment now in the high schools of Kansas.

Power machines now used in "B" and "C" high schools	No of schools having machines
Turning lathe	87
Circle saw	68
Emery wheel	57
Jig saw	35
Band saw	34
Jointer	27
Sander	25
Shaper	14
Planer	13
Press drill	11
No power machinery	11

Power machinery in the high schools has a fairly general distribution. Some of the schools have as high as 10 of the above named pieces of machinery while the number of machines in other schools varies from 10 to only one. Eleven schools have none at all. Of the 11 that have no power machines, five of them offer two years of woodwork and the other six offer only one year of woodwork. With the number of schools equipped with power machinery it will be necessary to

include work with power machines within the course of study in woodwork.

The following common needs of a woodworking shop were listed in the questionnaire and the instructors were asked to list them according to the importance of the need.

Table VI. The present needs of the woodworking shops.

Needs of the woodwork shop	No. of schools listing these as present needs
Finishing room	59
Power machinery	38
Project plans	36
Larger shop	23
Individual hand tools	15
Text books	13
General hand tools	12
Work benches	11
Source books	8
Magazines	5

The finishing rooms are most needed and are among the most important necessary equipment for a course in woodwork. All projects are given some kind of a finish, and in order to put on any kind of a finish and

get a good one, one must have a clean, well ventilated place which can be kept at the proper temperature for finishing.

The idea that all woodwork should be done by hand is gradually being replaced by the idea that power machines should be used because outside of school most of the woodwork is done on machines to speed up production and cut down production costs. Although there are 361 pieces of machinery in the 111 schools studied in this report, there are still 38 schools that list power machinery as one of their needs, putting power machinery second in the list of needs for woodworking. At the present time these schools average a little over three machines to a school.

Project plans rank third in the list of present needs in the shop. Until a few years ago project plans were hard to get that could be used in the average woodworking shop. They were mostly plans for colonial furniture and other large heavy pieces. At the present time however there are several good project books on the market besides the magazines which contain projects that can be used in first or second year woodwork.

A larger shop was needed by 23 schools. In most

school buildings, except the newest ones, the woodworking shop is located in a corner where it will take up the least room and not bother the rest of the classes. In most cases this out-of-the-way place happens to be in the basement. The development and building up of this department was not considered when the schoolhouse was planned. Consequently the woodworking shop was put any place that was not wanted for something else. The newer buildings which I have seen have planned a unit for woodworking, and have put in painting rooms, dust-proof drying rooms, lumber rooms, tool rooms, offices, and drawing rooms. One of the nicest and best planned shops that I have seen recently is at Russell, Kansas.

Individual hand tools, general hand tools, and work benches ranked fifth, seventh, and eighth respectively. All of these are very important and form a basis upon which woodwork is built. Due to present conditions and conditions that have existed for several years, these tools and benches have been allowed to run down for want of funds to buy new ones. Old, broken, worn out tools are a great handicap to the pupils who are really trying to do good work. The

work bench proposition is a little different. As long as the bench stands on four legs and the top is still there, it is hard to get any results from an effort to get new ones. As long as there is room around a bench for all the boys to work, it is difficult to make the outside world see the need for more benches. The need for larger shops, as shown above, offers another problem as to where to put these benches for the overload of pupils in the shop.

Text books ranked sixth as a need in the schools. As shown in table I, there are at the present time only 35 schools not using a text book. Thirteen of these schools have listed text books as one of their present needs. "As we look into the future, there can be no question that one of the most important prerequisites to progress in the teaching of industrial and vocational subjects is teachers who are acquainted with and skilled in using text-books, reference books and other printed helps."[1]

Source books, and magazines ranked ninth and tenth as needs of the woodworking shop. There were

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1 Bawden, Wm. T., "Review of Industrial Education for the Biennium 1934-1935." Industrial Education Magazine, March, 1936, p. 81.

only 22 schools that did not have reference books; and in the needs of these schools, eight of them listed such books. Magazines ranked last in the list as a need in the schools. This is probably due to the recent requirement for accredited schools to subscribe to a certain number of magazines for each department in the school. Magazines are very helpful in the woodworking department because of the fact that they publish all the up-to-date developments in woodwork and also keep new projects before the students of the department. The foregoing needs are not very beneficial as a help in making a course of study, but they do give us an idea of the conditions of the woodworking departments of these schools.

Part d.

Part d. consists of results concerning the courses being taught, the number of pupils enrolled in each of these courses, and the average length of periods given to woodwork.

Table VII. Courses in woodwork now being offered in the class "B" and "C" high schools.

Year in H. S. that woodwork is offered	No schools offering woodwork in each year
Offered in 7th and 8th grade	7
Offered in 8th grade	2
Offered 1 yr. woodwork in high school	34
Offered 2 yr. woodwork in high school	70
Offered 3 yr. woodwork in high school	6
Offered 4 yr. woodwork in high school	1

From table VII we find that of the 111 schools offering woodwork, only nine schools offer it in the seventh and eighth grades, and only seven offer more than two years of woodwork. This leaves 104 schools which offer either one or two years of woodwork. From this table it can readily be seen why this course of study is limited to two years of woodwork. This course will work with a year course of woodwork as well as with a two year schedule because the course is so arranged that the instructor can use any unit or part of a unit that becomes necessary for the completion of projects in woodwork no matter whether in the first or second year.

Table VIII. The number of pupils in wood-working classes.

No. of pupils	No. of classes	No. of pupils	No. of classes
1 pupil	1	12 pupils	15
2 pupils	3	13 pupils	9
3 pupils	9	14 pupils	8
4 pupils	13	15 pupils	6
5 pupils	18	16 pupils	9
6 pupils	15	17 pupils	1
7 pupils	14	18 pupils	1
8 pupils	17	19 pupils	2
9 pupils	12	20 pupils	1
10 pupils	25	21 pupils	2
11 pupils	10	27 pupils	1

Total number of pupils in wood working classes	1779
Total number of classes in wood ork	194
Average number of pupils to a class	9.03

Out of the total number of woodworking classes, one was held two periods per week, four classes were held three periods per week, 155 classes were held five periods per week and 22 classes were given ten periods per week. The five period per week classes were far more numerous than the rest of the classes. The per-

iods in the foregoing discussion differed in length from 40 minutes to 90 minutes. There were 23 classes which held periods of 40 minutes, eight classes that held 45 minutes, two classes that held 55 minutes, 116 classes that had 60 minute periods, two classes that had 70 minute periods, one class that had 75 minute periods, 26 classes that had 80 minute periods, and four classes that had 90 minute periods. (Note following table.)

Table IX. Length of periods of woodworking classes.

Length of periods	Classes using this length periods
40 minute periods	23
45 minute periods	8
55 minute periods	2
60 minute periods	116
70 minute periods	2
75 minute periods	1
80 minute periods	26
90 minute periods	4
Average length of periods for woodwork	56 min.

Part e.

Part e consists of space left for "Additional

Suggestions and Comment." These comments will tend to show the conditions of the woodworking departments in the high school.

> "I agree that there is need for a definite uniform course of study. One is needed that can at least be used as a guide, also to help systematize the small shop. You'll find those who oppose a cut-and-dried course of study, but I think it would be a help."
>
> "Will agree that we need some type of a general course of study for woodwork, at least a plan to follow."
>
> "We need a Kansas course of study for high schools. I don't find any two industrial arts men teaching the same thing at the same time another man does. Tests can't be standardized until we have a course of study."
>
> "The weaknesses of our department are: inadequate preparation of instructor, no definite course of study, and poor conditions of equipment."
>
> "Any suita le course of study would have to be broad enough to cover many items not needed in some communities. Personally I am glad to have one class where I do not have to follow a course of study."
>
> "I use no prescribed course of study. The first twèlve weeks are devoted to drawing and turning, then comes squaring up stock and learning how to handle and care for tools. After the class has mastered these I assign each individual a project which includes types of joints and procedures. I assign reference material to cover each phase of the course before it is taken up."
>
> "I certainly am in need of a good usable course of study."

"Our school has a room both as an industrial arts shop and athletic dressing room which causes many distractions, with poor facilities to keep material after it is made. There is no finishing room."

"I am certain that you have a worthwhile project. A suitable course of study could act as a guide at least for the average class."

"The housing conditions for our industrial arts department is described by the state department as deplorable, due to the lack of room and modern facilities. However this will likely be remedied in another year by a new building."

"I feel that there should be some kind of a prescribed course of study for a course in woodworking."

"It has been the custom in this school for the manual training classes merely to do woodworking without the aid of texts, references or tests. I would like to work in a short unit of mechanical drawing and also a series of objective tests."

"I suggest a course of wood finishing to be taught along with the beginning of each wood orking course. The average high school student knows nothing about finishing wood after he has completed a project."

"I have found that individual instructors giving aid as needs arise, and an attempt to meet the individual needs of each student as they arise is most satisfactory. I have taught industrial arts eight years and have found no good course of study."

Summary of the Findings

The need for a course of study is plainly shown by the results of the questionnaire. Only eleven schools are using the suggested course, which is for only one year of woodwork and is described as too general and not covering enough ground by most of the instructors using it.

Of the 111 schools more than half of them are using home-made courses of study, and thirty of these home-made courses are "memory" courses, not even written down. A student changing schools at the end of the first semester, or any time for that matter, may not have covered much of the work in the school that he left which his new school requires for the same amount of credit.

The basis for the course of study, text books and reference books has been determined by the results of the questionnaire. Only 11 schools reported no text books or reference books so that a course of study based upon these texts and references will accommodate the greatest per cent of the schools by giving them something that they can use in connection with books already available.

Sixty-six schools offer some upholstering in connection with woodwork. This upholstering consists of simple jobs and only as projects demand some of this work. At some times there will be three or four doing some upholstering job, for instance a footstool, or re-upholstering something from the home; at other times there will be no one at all working at upholstering, but there is enough demand to justify some upholstering being offered.

Power machinery is gradually being introduced into the high schools until only eleven schools are without some form of power machinery. Eighty-seven of these schools have turning lathes which demand some work in wood turning being offered by a course of study if it is to cover the available equipment for woodwork. With 101 schools having various power machines it is necessary that a course of study offer the required work so that these machines will be of utmost value to the schools. In our "machine age" it is very valuable to the pupils to be able to work with machines as well as with hand tools that were deemed so important a few years ago.

This course of study covers the necessary years and grades in the class "B" and "C" high schools of Kansas. The questionnaire, showing that only nine

schools offer woodwork before the ninth grade and only seven offer more than two years of woodwork, points the way. This limits the extent of the course of study to two years of woodwork, 104 schools offering either one or two years.

The length of the class periods ranged from 40 to 90 minutes, the 60 minute period predominating. The number of periods per week ranged from two to ten. One hundred fifty-five classes were held five periods per week. All but five schools offered woodwork two semesters both years.

Using the results obtained from the questionnaire, this course of study will be constructed on the text books and reference books used by the schools. It will cover upholstering, bench work, finishing and machine woodworking. All these units have been proven necessary by the questionnaire and by present practices in the woodworking departments.

CHAPTER III

A Course Of Study For Two Years Of Woodwork In Class "B" And "C" High Schools Of Kansas

The first thing to be taken into consideration when constructing a course of study is the desirable outcome to be obtained. The general objectives set up for education as a whole will apply to woodwork, some to a greater extent than others. It is doubtful whether any so-called academic subject affords experiences so effective in developing the attitudes and habits which contribute to "Worthy use of leisure," "Worthy home membership," or "Vocational interests," as do the experiences in the field of industrial arts.[1]

It is the function of industrial art's work to aid general education to realize its aims of developing the individual into a useful, happy and successful citizen by providing experiences which will make him a

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1. American Vocational Association Committee on Standards of attainment. Standards of Attainment in Industrial Arts Teaching. Bloomington, Illinois, Pantagraph Printing and Stationery Co., 1934 p. 9.

more useful producer, a more appreciative and happier consumer, and a more valuable citizen.[2]

At the present time there is a lack of agreement as to the proper objectives for woodwork.[3] The following objectives, set up by the American Vocational Association in 1934, should be kept in mind by all woodwork teachers and they should assume the responsibility in teaching these things.[4]

Objectives of Woodwork

1 To discover interests and aptitudes that have significance in life work. (Vocational guidance)

2 To develop thoughtful attitudes in the matter of making things easy and pleasant for others. (Social outcome)

3 To develop an attitude of readiness to assist others when they need help. (Cooperation)

4 To develop a habit of careful, thoughtful work, without wasting time. (Industry)

5 To develop avocational interests or worthy use of leisure time.

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2. American Vocational Association Committee on Standards of attainment. Standards of Attainment in Industrial Arts Teaching. Bloomington, Illinois, Pantagraph Printing and Stationery Co., 1934 p. 12

3. Ibid. p. 2

4. Ibid. p. 12

6 To develop an attitude or responsibility.

7 To develop handy-man abilities.

8 To develop proper habits of thinking.

9 To develop in each pupil the habit of self-discipline which requires one to do a thing when it should be done whether it is a pleasant task or not.

10 To develop in each pupil the habit of an orderly method of procedure in the performance of any task.

This course of study is divided into four units so that the material will be more readily available and will be easier to locate through the use of the table of contents.

There has been no attempt made to make a distinction between the first year woodwork operations and the second year operations. Logical sequence of operations and the assignment of projects by the instructor according to the individual's ability will naturally divide the operations. The reason for making no attempt to divide these operations is the free choice method of selecting projects. All projects do not have the same tool problems or require the same kind of finish. In the beginning course in woodwork the instructor can easily control the number and kind of tool processes by assign-

ing a group of projects to be made that have already been analyzed, but even then some of the more apt students will forge ahead until they are making projects demanding processes ordinarily introduced in the second year of work. Therefore, the following course of study will consist of four units: bench work, wood finishing, upholstering and machine woodworking. Under each of the four units there will be a list of things that the pupils should be able to do upon completing a course of woodwork. There will be also a list of things that the pupil should know and a list of references telling the exact place that this information on "how to do" and "what to know" can be found. This list of references was obtained f om the schools, so that all schools covered in this study will have access to some of these references.

The following list consists of 107 things that the American Vocational Association has set up as a goal that each pupil should be able to do at the end of a course in woodworking.[5] The following course of study will cover this list and several additional manipulations taken from other books and courses of study.

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5. American Vocational Association Committee on Standards of Attainment. Standards of Attainment in Industrial Arts Teaching. Bloomington, Illinois, Pantagraph Printing and Stationery Co., 1934 pp. 35-36.

Hand Work

1 Read a working-drawing.
2 Make out a bill of material.
3 Plan the procedure in doing your job.
4 Check material when received.
5 Measure and divide spaces with a rule.
6 Lay out pattern on stock.
7 Check the layout.
8 Lay out curves with dividers or compass.
9 Divide space with dividers.
10 Gage with a pencil.
11 Gage with a marking-gage.
12 Test for squareness with the try-square.
13 Adjust a jack-plane or a smooth-plane.
14 Lay out square cuts with the try-square.
15 Plane a surface true.
16 Plane an edge square with an adjoining surface.
17 Plane end-grain.
18 Proceed properly in squaring up a board.
19 Saw to a line with cross-cut or rip-saw.
20 Use a back-saw.
21 Saw inside or outside curves with coping-saw.
22 Round edges.
23 Finish outside curves.
24 Finish inside curves.
25 Drill holes in wood.
26 Countersink holes.
27 Bore holes with an auger-bit.
28 Fasten with screws.
29 Use brad-awl for making holes for screws or nails.
30 Trim or pare with a chisel.
31 Smooth a surface with sandpaper.
32 Shape ends, edges, and curves with wood rasp.
33 Drive and draw nails.
34 Set a nail or brad.
35 Lay out and test bevel cuts with the sliding T-bevel.
36 Round or form work with a spokeshave.
37 Lay out an octagon.
38 Lay out and cut a chamfer.
39 Use handscrews and clamps.
40 Apply stain.
41 Clean and care for stain-brushes.
42 Apply stain for a two-tone effect.
43 Apply fillers.
44 Apply shellac.

45 Clean and care for shellac-brushes.
46 Apply wax.
47 Apply enamel.
48 Clean and care for enamel-brushes.
49 Transfer a design.
50 Lay out irregular design by means of squares.
51 Make a butt-joint.
52 Sharpen edge tools, such as a knife, chisel and plane.
53 Keep tools free from rust.
54 Adjust a block-plane.
55 Cut curves with a compass-saw.
56 Use a gouge for gouge work.
57 Smooth a surface with a scraper.
58 Lay out a hexagon.
59 Prepare glue.
60 Glue up work.
61 Give a fumed-oak finish.
62 Apply paint with brush.
63 Clean and care for paint-brushes.
64 Lay out duplicate parts.
65 Make a notch joint.
66 Make a half-lap joint.
67 Lay out and cut a dado joint.
68 Cut a groove or rabbet.
69 Lay out and cut a cross-lap joint.
70 Make an edge-to-edge glue joint.
71 Lay out and cut tapers.
72 Do upholstery involving simple padding.
73 Do simple upholstery involving webbing and rolled edges.
74 Do simple upholstery involving use of springs.
75 Dress a screwdriver.
76 Set and use an expansive-bit.
77 Cut curves with a turning-saw.
78 Lay out an ellipse.
79 Put on locks.
80 Put on drawer-pulls.
81 Fit hinges.
82 Put on ball-catches.
83 Apply varnish.
84 Clean and care for varnish brushes.
85 Apply lacquer.
86 Clean and care for lacquer brushes.
87 Apply finish with a spray-gun.
88 Apply inlay.
89 Lay out and cut a miter joint.
90 Make a dowel joint.
91 Make a doweling jig.
92 Lay out and cut a blind mortise-and-tenon joint.

93 Lay out and cut a through mortise-and-tenon joint.
94 Lay out and cut a haunched mortise-and-tenon joint.
95 Construct a panel.
96 Make a splined joint.
97 Lay out and cut a housed joint.
98 Make a drawer-slide.
99 Make and fit a drawer.
100 Fasten on a table top.
101 Fasten with lag-screws or bolts.
102 Cut an edge mold.
103 Sharpen a scraper.
104 Sharpen auger-bits.
105 Sharpen a saw.
106 Use a Forstner bit.
107 Clean and care for a spray-gun.

The following list of books and magazines are those now being used by the majority of the class "B" and "C" high schools in Kansas.

The number at the left of the reference source will be used as an identification number through the course of study. (For example, (18) 22:54 July, 1933. The sharpening of a plane, means that you could find how to sharpen a plane by looking in the Popular Science Monthly Vol. 22, page 54 for July, 1933. The Popular Science is No. 18 in the list below.)

(1) Instructional and Informational Units for Hand Woodworking---Douglas and Roberts.

(2) Principles of Woodwork----Hjorth.

(3) Essentials of Woodwork---Griffith.

(4) Instructional Units in Wood Finishing--McGee & Brown.

(5) Handwork in Wood--Noyes.

(6) Instructional Units in Hand Woodwork--Brown & Tustison.

(7) Wood and Forests--Noyes.

(8) Educational Woodwork--Park.

(9) Wood and Lumber--Newell.

(10) Essentials in Upholstery--Bast

(11) Design and Construction in Wood--Noyes.

(12) Problems in Wood Turning--Crawshaw.

(13) A Course in Wood Turning--Milton & Wohler.

(14) Principles of Mill and Paint Shop Practice--Waring.

(15) Industrial Arts Magazine--Bruce Publishing Company.

(16) Popular Homecrafts Magazine--General Publishing Co.

(17) Machine Woodworking--Hjorth.

(18) Popular Science Monthly.

(19) Beginning Woodwork--Van Deusen.

(20) Industrial Education Magazine--Manual Arts Press.

These magazines will be mentioned by number only in the following pages so it will be necessary to refer to this page when looking for references.

In the following outline for a course of study, the Roman numerals I, II, III, etc., denote the specific objectives of the course and the lower case letters a, b, c, etc., denote sub-divisions of these objectives.

Unit I.

Bench Work

I. To become familiar with the elementary shop procedures in woodwork.

a. Benches, tools and lockers to use.
b. Arrangement of lumber stock on hand.
c. Arrangement and general rules governing the finish room.
d. Arrangement of general tool room.
e. General rules governing the woodworking shop as a whole.

(This information is to be supplied by the teacher through lecture method and tour of the shop.)

II. To be able to do all planing operations. 250-302 series of projects analyzed. (2)

a. Selecting a project.
(15) 15:27-29

b. Securing and interpreting a working drawing.

(6) 4-9 Definite instructions on reading.
(1) 5-10 Instructions on reading a working drawing.
(3) 173-178 Working drawings.
(19) 10-13 Working drawings.

c. Making out a stock bill.
(8) 10-16 Good example of bill of materials.
(1) 10-11 Examples of bills.
(2) 280; 285; 288; 294; 299; Stock bills.
(15) 20:230 June 1931 Bill of material.
(20) 33:144-6 Nov. 1931 Analysis of projects.
(17) 15:17-9 Jan, 1926 Project analysis.
(15) 20: 351-2 Oct. 1931 Assignment sheets.
(20) 33:113-114 Oct. 1931 Instruction sheet.

d. Planning procedure.
(1) 11-12 Suggested procedure for a footstool.
(1) 93-102 Series of projects analyzed.
(2) 264-302 Suggested procedure for each project.
(6) 3 Procedure.
(19) 15-22 Game board, laying out and sawing.

III. To know the history and development of our woodworking tools.

a. The hammer.
(15) 23:317-319 Oct. 1934.
(15) 27:83 Feb. 1938.

b. The axe.
(15) 23:349-349 Nov. 1934.

c. The bits.
(15) 24:8-10 Jan. 1935.

d. The saw.
(15) 23:380-381 Dec. 1934.

e. The bit brace.
(15) 24:76-78 Mar. 1935.

f1 The chisel and gouge.
(15) 3:114-115 Apr. 1935.

g. The planes.
(15) 24:145-146 May 1935.

h. The lay out tools.
(15) 24:180-182 June 1935.

i. The mallet, holding tools, knife and awl.
(15) 24:211-212 July 1935.

IV. To know how to get out stock.

a. Measuring and marking.
(6) 1-3 To get rough stock for a report.
(6) 17-28 Use of ruler, try-square, marking gage, bevel and framing-square.
(1) 13-16 Ruler, try-square, squaring by measuring diagonals.
(15) 20:481 Dec. 1931 Reading the rule and square.
(15) 33: Sept 1931 Supplement tracing No. 86-87.
(6) 17-21 To measure.
(6) 23-26 How to lay out lines using the square.
(3) 9-10 The rule.
(16) 2:168 July-Aug. How to lay out and saw stock.
(3) 10-17 Try-square, framing square, T-bevel, marking gage, pencil gage.
(6) To pencil gage, 31.
(16) 1:450 Jan. and Feb. How to use the marking gage.

b. Use of the rip saw.
(6) 37-39.
(1) 17-20.
(5) 62-68.
(6) 40-49 Fitting a hand saw.
(3) 21-23 Use of a rip saw.
(4) 65 The rip saw.
(1) 91-92 Setting and sharpening.

c. Use of the cross-cut saw.
(6) 33-37.
(1) 17-20.
(5) 62-68.
(3) 23-24 The cross-cut saw.

(4) 64 The cross-cut saw.
(6) 40-49 Fitting a hand saw.
(1) 91-92 Setting and sharpening a saw.
(2) 54-55 Jointing, setting and drilling.

d. Charge material to the student's account.

V. To be able to surface the stock of a simple piece requiring the use of block plane, marking gage, try-square and bench fixtures.

a. Surface planing.
(3) 329-335 Planes.
(6) 66-70 Planing surfaces.
(5) 69-78 Planes and squaring.
(6) 50-51 Routing order.
(1) 21-24 Use of hand planes.
(1) 27-28 Squaring to dimensions.
(2) 70-71 Squaring to dimensions.
(2) 75-76 Squaring legs.
(2) 76-77 Tapering legs.
(3) 36-40 Facing boards.
(17) 25-38 Swing board (planing).

b. Edge planing.
(6) 71-75 To square an edge.
(2) 70-71 Squaring a small board.
(2) 71-73 Planing edge for glue joint.
(2) 73-74 Squaring a table top.
(3) 41 Edge planing.

c. End planing.
(6) 16-19 To plane end grain.
(20) 31:131 Oct.
(5) 77-78.
(20) 31:96 Sept. Planing an edge.
(2) 70-71 Squaring a small board.
(3) 43-44 End planing.

VI. To be able to use the back saw, the coping saw and the turning saw.

a. The back saw.
(1) 42 Use of back saw.
(2) 94-97 Use of back saw in cutting tenons.

(16) 3:52 May-June. How to saw with the back saw.
(2) 54-55 Sharpening saws.
(3) 24-26 The back saw.
(5) 65-67 The back saw.

b. The turning saw.
(3) 26 The turning saw.
(5) 67 The turning saw.
(19) 41-45 Coat hanger (curved sawing).
(18) 118:113 Mar. 1931. The turning saw.

c. The coping saw.
(15) 20: Supplement shop tracing No. 133, Oct. 1932.

VII. To be able to lay out geometrical figures, an ellipse, to transfer designs and make duplicate parts.

a. Geometrical figures.
(6) 99-100 Figures and designs.
(2) 4 Octagon.
(3) 178 Hexagon.
(3) 179 Octagon.

b. To lay out an ellipse.
(6) 100-101.
(3) 179 Drawing an ellipse.
(15) 23:162 April, 1934. The string method ellipse.

c. Transfer a design.
(4) 86-89 Transfers.
(6) 97-102 To lay out various figures and designs.
(2) 193-194 Transfers.

VIII. To be able to use and clean wood rasps and files.

a. Rasps and their uses.
(6) 84, 86, 90. To scrape a surface.
(2) 62-63 To clean rasps or files.
(5) 90-91 Files and rasps.

IX. To be able to make the common joints used in woodwork.

a. The mortise and tenon joint.

(1) 46 The blind mortise and tenon joint.
(6) To make a mortise and tenon.
(15) 136, 134 Mortise and tenon joints.
(1) 51-52 The blind mortise and tenon.
(6) 202 Blind mortise and tenon.
(16) 80 Feb. cutting mortise and tenon.
(2) 94-95 Blind mortise and tenon.
(2) 97 The hounched mortise and tenon.
(2) 97-98 A through mortise and tenon.
(2) 98 A slip mortise and tenon.
(3) 94-97 Mortise and tenon joint.
(3) 97-101 Blind mortise and tenon.
(3) 110 Hounched mortise and tenon.
(5) 160-164 Mortise and tenon joints.
(19) 79-89 Closed mortise and tenon construction.
(15) 24:64 April, 1934.
(15) 27:215 March, 1938.

b. The butt joint.

(1) 45 Common wood joints.
(1) 53.
(5) 152-154 Butt joints.
(6) 148-154 To fasten a butt joint with nails.
(6) 182-187 To make a rabbet and butt joint.

c. Miter joint.

(6) 167-171 To make and fasten a miter.
(3) 101 Miter joints.
(2) 110 Miter joints.
(18) 118:102 Mar. 1931. How to make a miter joint.

d. A dowel joint.

(1) 46 The dowel joint.
(6) 162-166 To fasten a butt joint with dowels.
(2) 85-87 Doweling butt joints, edge joints and miter joints.
(2) 87-90 Joining legs to turned columns.

(3) 92-93 Doweling.
(5) 175 Dowel joints.
(18) 119: 119 July 1931. Strong dowel joints for cabinet doors.

e. The dado joint.
(1) 45 The dado and rabbet joint.
(6) 188-192 Directions for dado joint.
(6) 193 To make rabbet and dado joint.
(5) 58, 131, 143, 144 Dado joints.
(2) 82 Dado and rabbet joint.
(3) 87 Dado joints.
(5) 157-158 Dado joints.

f. The rabbet joint.
(1) 45 The dado and rabbet joint.
(6) 182-187 To make a rabbetand butt joint.
(6) 193 To make a rabbet and dado joint.
(6) 186.
(2) 79 Making a rabbet joint.
(2) 82 A groove and rabbet joint.

g. A splined joint.
(2) 111 Spline joint.

h. A notch joint.
(5) 157 A notched joint.

i. The dove-tail joint.
(2) 103-106 Dovetail joints.
(3) 102-104 Dovetail joints.
(5) 158-159 Dovetail dado joints.
(5) 164-167 Dovetail joints.

j. Cross-lap and end-lap joints.
(15) 21:278-279 Sept. 1923. Cross-lap joints.
(2) 91 Cross-lap joint.
(3) 88-90 Cross-lap joint.
(5) 155-156 Half-lap joint.
(19) 47-53 Flower pot stool, cross-lap.
(2) 90-91 End-lap with rabbet.

k. Gained joints.
(6) 196-199 To gain for a joint.
(2) 81 To make a gain joint.

l. Grooved joints.
(2) 81 A grooved joint.
(2) 82 A groove and rabbet joint.

X. To be able to assemble with screws and nails.

a. Fastening with screws.
(6) 156-160 To fasten a joint with screws.
(5) 125-127.
(1) 37-40 Kinds and sizes of wood screws. How to fasten stock with screws.
(2) 130 To apply screws.
(3) 78-80 Screws.
(5) 125-127 Screws.
(18) 117:77 Oct. 1930. Driving screws.
(15) Aug. 1931. Tracing supplement No. 217. Wood screws.

b. Nailing operations.
(6) 151-152 Driving nails.
(3) 75-77 Nails.
(5) 123-125 Nails.
(18) 117-77 Pulling nails.
(15) Aug. 1931. Tracing supplement. (No. 218. Nails)

c. Corrugated fasteners.
(1) 38 Corrugated fasteners.
(6) 150-159 Corrugated fasteners.

d. Fastening a table top.
(2) 131 To fasten a table top in place.

XI. To be able to use the boring tools

a. Auger bits.
(6) 117-122 To bore with brace and auger bits.
(3) 48 Auger bits.
(3) 50-52 Boring with auger bits.

b. Drill bits.
(6) 123-126 To bore with twist drills or drill points.

(6) 117-119.

c. Expansive bits.
(6) 122 An expansive bit used to form part of a design.
(2) 19 The expansive bit.

d. Forstner bits.
(6) 118.
(2) 19 The Forstner bit.

XII. To be able to use the countersink, nail set and screw driver.

a. The countersink.
(1) 34 The countersink.
(3) 49 The countersink bit.
(2) 19 The countersink.

b. The nail set.
(3) 77 Nail sets.
(2) 21 The nail set.

c. The screw driver.
(6) 61 Selecting and using the screw driver.
(16) 2:560 Sharpening scrapers, auger bits and screw drivers.

XIII. To be able to distinguish between different grades of sandpaper, when and how to use them.

a. Sandpaper.
(6) 91-96 To sand an unfinished surface.
(3) 73-75 Sandpapering.
(1) 71-72 Sandpaper.
(18) 76 Feb. 1927.
(18) 120 Nov. 1929 Lathe sanding.
(6) 84-86-90 To scrape a surface.
(14) 142-143 Sandpaper.
(14) 143-144 Method of using sandpaper.

XIV. To be able to use glue.

a. Preparation of glue.
(6) 135 To mix and apply the common glues.
(1) 59 Kinds of glues and their composition.
(16) 86 June, 1931 Secrets of successful gluing.
(2) 119 Preparation of glue.
(5) 129-130 Preparation of glue.

b. Application of glue.
(6) 139-142 To glue up stock.
(18) 114, Dec. 1931 A few facts about applying glue.
(2) 119-120 Directions for gluing.
(3) 80-81 Glue.
(5) 130-131 General directions for gluing.
(18) 118:86 Secrets of successful gluing.

c. Clamping operations.
(6) 127-134 To clamp stock.
(3) 81-83 Clamps.
(1) 57 How to clamp stock for assembling.
(4) 101 Clamps
(2) 120 Gluing edge to edge.
(2) Gluing frame or panel.
(2) Gluing a drawer.
(2) 127-128 To glue doweled joints and irregular shapes.

XV. To be able to use planes, chisels and spoke shaves.

a. Planes.
(16) 5:162 How to use planes.
(5) 80-82.
(6) 76-77 To plane and grain.
(3) 45-46 Planing chamfers.
(5) 184 Chamfering.
(16) 3:460 Jan.-Feb. Sharpening edge tools.
(2) 55-57 Sharpening plane irons.
(6) 56-60 To grind a plane iron.
(6) 61-66 Whetting a plane iron.
(20) 31:378 June Grinding a plane iron.
(19) 91-92 Planing.
(15) 21:248 Aug. Plane iron grinding.

b. Chisels.
(1) 44 Paring end grain with a chisel.
(3) 53-57 The use of chisels.
(5) 58-59 Chisels.
(19) 47-61 Chiseling and jointing.
(19) 93-94 Chiseling.

c. Spoke shaves.
(2) 15 Spoke shaves.
(2) 55 (see sharpening of planes.)

d. Knives.
(6) 65.
(16) 106 Mar. 1930 Sharpening pocket knives.

XIV. To be able to use and care for scrapers.

a. The use of a scraper.
(1) 70 How to use a cabinet scraper.
(6) 84-89 To scrape a surface.
(3) 71-73 Scraping.
(5) 91-93 The use and sharpening of a scraper.

b. Sharpening a scraper.
(18) 2:58 May, 1931 How to use and sharpen a scraper.
(5) 91-93 The use and sharpening of a scraper.
(2) 58-60 Sharpening and adjusting a scraper.

XVII. How to use a gouge for gouge work.

(2) 57-58 Sharpening gouges.
(3) 58 The use of the gouge.
(5) 59-60 The gouge.

XVIII. To be able to apply hinges, hasps, catches and locks.

a. Applying hinges.
(6) 211-214 Hanging a door.
(3) 113-115 Hinging a door.

(5) 131-133 Hinges.
(1) 63 Hinges and other hardware.
(1) 65 How to install hinges.
(16) 115 Hinges.
(18) 140 Oct. 1929 Hints in applying spring hinges.
(18) 114 Right hinges save work.
(18) 115 Hinges.
(2) 130-134 Application of hinges.

b. Applying drawer pulls and knobs.
(1) 63 Hinges and other hardware.
(2) 138 Attaching furniture pulls and knobs.

c. Applying catches.
(16) 80 June, 1930 Door catches and how to apply them.
(2) 136-137 Attaching furniture pulls and knobs.

d. Application of locks.
(6) 215 To attach a cabinet lock.
(2) 134-136 Application of locks.
(4) 133-134 Inserting locks.

XIX. To be able to make and fit a drawer or door.

a. Drawer construction.
(15) 22:24 Drawer joint construction.
(2) 107-109 Drawer construction.
(2) 124-125 Gluing a drawer.
(3) 106-109 Drawer construction.
(5) 191-192 Drawer construction.

b. Door construction.
(18) 102 Jan. 1930 Attaching door fastenings.
(3) 112 Fitting a door.
(3) 113-115 Hinging a door.

c. Construction of a panel.
(2) 109-111 Panel construction.
(3) 109-110 Paneling.
(5) 192-195 Panel construction.

XX. To be able to apply surface decoration.

a. Veneering.
(16) 2:558 Mar-Apr. Veneering inlay ideas.
(15) 118:479 Dec. Methods of transfering designs to wood.
(2) 189 To match and apply veneer.
(2) 242-243 Veneers and plywoods.

b. Overlaying.
(2) 192 Overlaying.

c. Inlaying.
(2) 167.
(16) 2:91 May Inlaying banding.
(16) 2:276 Sept. Manual of inlaying.
(16) 3:255 Oct. Linoleum inlays for tables and floors.
(2) 167-173 Inlaying.
(18) 117:127 Oct. 1930 Tools for making inlaying easier.

d. Carving.
(2) 181-184 To do simple carving.
(18) 116:86 Jan. 1930.
(15) 22:344 Nov. 1933.
(15) 23:251 Aug. 1934.
(15) 24:228 Aug. 1935.
(15) 22:178 May 1934.
(15) 23:230 July 1934.
(15) 23:6-8 Jan. 1934.
(15) 23:119 Mar. 1934.
(15) 23:145 Apr. 1934.
(15) 24:261 Sept. 1935.
(15) 24:290 Oct. 1935.
(15) 24:328 Nov. 1935.

XXI. To be able to use the sliding T-bevel, dividers, mortising gage and framing square.

a. The dividers.
(1) 14 The dividers.

b. The sliding T-bevel.
(2) 3 Sliding T-bevel.
(6) 26-28 To lay out angles other than 90 degrees.

c. The mortising gage.
(6) 202 The mortising gage.
(1) 14 Mortising gage.

d. The framing square.
(1) 13-16 Laying out tools.
(1) 15 How to read and use rule and square.
(3) 10-17 Try-square and framing square.

XXII. To be able to do the following shaping operations.

a. Chamfering.
(6) 80-83 To plane a through chamfer.
(1) 29-30 How to plane chamfers and bevels.
(16) 3:187 July and August.
(3) 45-46 Chamfering.
(5) 184 Cutting a chamfer.

b. Beveling.
(1) 29-30 How to plane chamfers and bevels.
(6) 74 How to level an edge.

c. Tapering.
(2) 76-77 Tapering legs.

d. Cutting circular curves.
(6) 103-105 To saw curves.
(1) 31-32 How to lay out, cut and finish curves.

XXIII. To be able to sharpen and care for tools.

a. Keeping tools free from rust.
(15) 19:277 June, 1930.
(15) 24:341 Nov. 1935.

b. Rip saws.
(1) 91-92 How to set and sharpen hand saws.
(6) 67 Sharpening saws.
(2) 54-55 Sharpening saws.
(3) 27-28 Saw filing.
(18) 117:107 July, 1930 Setting a hand saw.

c. Cross-cut saws.
(1) 91-92 How to setand sharpen hand saws.

(5) 57 Sharpening saws.
(2) 54-55 Sharpening saws.
(3) 27-28 Saw filing.
(18) 117:107 July, 1930 Setting a hand saw.

d. Circular saws.
(18) 81 Aug., 1931.
(2) 63-66 Circular saws.
(17) 38-40 Circular saws.

e. Band saws.
(18) 96 Feb. 1932 Sharpening small band saws.
(2) 66-68 Sharpening band saws.
(17) 343-346 Band saws.

f. Auger bits.
(18) 117:77 Oct., 1930 Sharpening auger bits.
(2) 60 To sharpen auger bits.

g. Drill bits.
(18) 119:113 Nov., 1931 Beginner's method of sharpening drills.

h. Screw drivers.
(15) 21:247 Aug., 1932 Dressing a screw driver.

i. Chisels.
(2) 55-57 Sharpening plane irons, spoke shaves and chisels.
(3) 61-63 Sharpening chisels.

j. Plane irons.
(2) 55-57 Sharpening plane irons.
(3) 61-63 Sharpening plane irons.

k. Scrapers.
(2) 59-61 Sharpening hand scraper.
(18) 117:77 Oct., 1930 Turning a scraper edge.

l. Gouges.
(2) 57-58 Sharpening gouges.

XXIV. To know something of the characteristics and structure of wood.

a. Kinds of wood.
(14) 8-32 Needle-leaved domestic woods.
(14) 35-83 Broad-leaved domestic woods.
(14) 87-97 Imported hardwoods.
(3) 138-149 Classification of trees.
(7) 58-195 American species of woods.
(15) 21:13 Jan., 1932.
(15) 24:276 Sept., 1935.

b. Structure of woods.
(2) 224-227 Structure of wood.
(3) 116-125 Structure of wood.
(7) 9-39 Structure of wood.
(9) 28-55.

c. The native woods of the locality.
(Must be worked out by the instructor.)

XXV. To know the methods of obtaining lumber.

a. Obtaining lumber.
(2) 230 Logging operations.
(3) 126-129 Lumbering.
(2) 231-233 Sawing the logs.
(5) 30-44 Sawmilling.
(3) 129-137 Milling.
(9) 181-185 Manufacture of lumber.

b. Seasoning of lumber.
(2) 233-238 Seasoning of lumber.
(5) 45-50 Seasoning.
(9) 104-114 Seasoning of wood.

The following space will be left for new references to be added from time to time.

Unit II.

Wood Finishing

I. To be able to prepare wood for wood finishing.
(2) 212-213 To prepare the surface.

a. Filling holes.
(14) 217 Stick shellac.
(14) 218 Plastic wood.
(14) 220 Putty glazing.
(4) 25-26 Stick shellac.

b. Scraping.
(6) 89 Scrape the surface.
(1) 70 How to use a cabinet scraper.

c. Sponging.
(16) 2:58 May-June, 1932 How to sponge.

d. Sanding.
(6) 91-96 To sand an unfinished surface.
(1) 71-73 Sandpaper.
(14) 143 Method of sanding.

II. To know the composition of stains, when and how to use them.

a. Application of stains.
(14) 161-166 Elements of stain practice.
(1) 77-78 How stains are applied to wood.
(4) 13-14 Application of water stains.
(2) 214 Directions for staining.
(15) 22:239 July, 1933.
(15) 23: Supplement No. 284.

b. Water stains.
(14) 155 Water stains.
(2) 312 Water stains.
(5) 210 Water stains.

c. Preparation of stains.
(14) 149 Preparing stains.

d. Oil stains.
(14) 158 Oil stains.
(4) 9-13 Application of oil stains.
(2) 214 Oil stains.
(5) 209-210 Oil stains.

e. Spirit stains.
(14) 153 Acid wood stains.
(4) 15 Application of spirit stains.
(5) 211 Spirit stains.

III. To know the composition of fillers and how to apply them.

a. Kinds of fillers.
(3) 154 Fillers.
(5) 213 Fillers.
(14) 178 Fillers for stained finishes.

b. Preparation of fillers.
(14) 177-178 Filler base.
(4) 16-20 Preparation and application of fillers.

c. Application.
(14) 179-180 Fillers and stains.
(14) 181 Sizing the filler coat.
(15) 27:12 Jan., 1938.
(1) 79-80 How to apply wood filler.
(2) 215 To apply fillers.
(3) 155 Filling with fillers.
(5) 214 Filling.

d. Sealer coat.
(14) 167-169 Sealer coats.
(14) 172 Sanding sealer coats.

IV. To know how to use shellac.

a. Preparation of shellac.
(14) 22 To prepare and apply shellac.
(5) 149 Care of shellac brushes.

b. Application of shellac.
(1) 81-86.
(4) 23-25 To apply shellac.
(14) 171-172 Preparation for varnish.
(2) 216-217 To apply shellac.

c. Rubbing.
(14) 205 Rubbing a shellac coat.
(4) 46 Rubbing down shellac.
(4) Rubbing down shellac --25

d. Waxing and polishing.
(4) 27 To apply a wax finish.
(2) 218 To apply wax.

V. To know how to use varnish.

a. Preparation for varnish.
(14) 171-172 Preparation for varnish.
(4) 30-31 Prepare surface.
(4) 29 Varnish.

b. Application of varnish.
(14) 191-202 Steps in varnishing.
(14) 202-204 Varnishing turned work.
(4) 31-32 Application of varnish.
(2) 217-218 To apply varnish.
(5) 215-220 Varnishes.

c. Care of brushes.
(14) 183-188 Care of brushes.
(14) 255-256 Brushes.
(4) 149.
(18) 117:106 Aug., 1930 Caring for brushes.

d. Rubbing varnish.
(14) 206 Rubbing a varnish coat.
(14) 207 Oil rubbing.
(14) 207 Water rubbing.
(14) 214 Satin finish.
(4) 40-46 To rub down varnish.

VI. To be able to apply a lacquer finish.

a. Nature of lacquer.
(14) 268 Lacquer.
(4) 36-37 Lacquer finish.

b. Kinds of lacquer.
(14) 269 Chinese lacquer.

(14) 270 Modern lacquer.
(14) 281 Brushing lacquer.

c. Method of application.
(14) 275 Preparation of furniture.
(14) 273 Application of lacquer.
(15) 27:38-39 Jan., 1938.
(18) 118:92 Helps for using brushing lacquer.
(18) 117:77 July, 1930 How to spray finish.
(4) 38-39 Prepare and apply 1st coat.
(4) 46 Rubbing down lacquer.

d. Lacquer brushes.
(14) 274 Lacquer brushes.
(18) 120:81 Mar., 1932 A cheap way to clean lacquer brushes.

VII. To know how to apply paint.

a. Preparation for painting.
(18) 116:115 Feb., 1930 How to test paint.
(18) 117:122 Oct., 1930 Ways to overcome outside painting difficulties.
(18) 118:108 Jan., 1931 The right paint brush.
(14) 332-336 Paint pigments.
(4) 56.

b. Priming coat.
(14) 346 Priming new work.
(14) 333 Priming coat.
(4) 58-59 Applying priming coat.

c. Mixing paint.
(14) 338-339 Hand mixed paints.
(14) 361-363 Color mixing.
(14) 365-367 Color formulas.
(4) 53-55 Coloring paints.

d. Application of paint.
(14) 346-354 Painting operations.
(14) 357-Repainting old work.
(14) 344-345 Brush equipment.
(4) 56-57 Painting new work.

(4) 61 Applying paint.
(4) 57 Painting old work.

e. Applying inside paint.
(2) 220-222 Inside painting, preparation of surface, priming coat, filling holes, and finishing coats.
(14) 368 Undercoat primer.
(14) 368-369 Four hour enamels.
(14) 369 Varnished floors.
(14) 373 Stippling.
(14) 374 Tinting.
(14) 378 Finishing kitchens.
(4) 63-67 Inside painting.
(4) 371 Priming new walls.
(4) 68-73 Painting inside walls.
(4) 74-81 Inside finishes.

VIII To know how to use the spray gun.
(14) 323 Care of the spray gun.
(14) 324-325 Application of paint and varnish with the spray gun.

This space is left to add future references on wood finishing.

Unit III

Upholstering

I. To be able to make a plain pad seat.
- (2) 196-197 Making a pad seat.
- (2) 197-199 Pad seat with role edge.
- (10) 57-62 A pad seat on a wood base.

II. To be able to upholster a slip seat.

a. Put on webbing.
- (2) 200 Upholstering a slip seat.
- (10) 62-66 Upholstering an open structure.
- (10) 69-83 Upholstering foot stools.
- (10) 12-16 Webbing.
- (15) 19:115 Webbing and rolled edges.
- (15) 22:235-246 Webbing.

b. Pick stuffing and place it on frame.
- (2) 201 Apply tow or moss.
- (10) 33-34 Stuffing.
- (10) 48-51 Filling cushions by hand.

c. Putting on muslin and burlap.
- (10) 28 Attaching burlap.
- (10) 29 Roll edge on wood.
- (10) 31 Stitched edge.

d. Putting on gimp.
- (10) 51-52 Putting on gimp.

e. Springs.
- (10) 16-26 Putting on springs.

f. Covering.
- (10) 34-36 Planning and cutting covers.
- (10) 39-42 Cutting for corners and making pleats.
- (10) 87-90 Upholstering spring seat.

g. Upholstering material.
- (10) 115-166 Their source and manufacture.

Unit IV

Woodworking Machinery

I. To place machinery properly.

(14) 112-120.
(17) 309-359 Installation and maintenance.
(18) 118:112 June, 1931 Caring for electric motors.

II. To know how to operate the jointer.

a. Safety rules.
(14) 124 Use of push stick.
(17) 126 Safety rules for the jointer.
(15) 23:60-7 Feb., 1926.

b. Adjust and care for the jointer.
Follow manufacturers' directions.
(2) 40 Adjusting the jointer table.
(17) 127 Adjusting the outfeed table.
(18) 118:124 Feb., 1931 Cuts and short cuts on a jointer.

c. Joint an edge.
(17) 128 Edge planing on the jointer.

d. Surface narrow stock.
(17) 130-132 Surface planing on jointer.
(17) 132 End planing on a jointer.

e. Cut a rabbet.
(2) 83 Cutting tongues, grooves and rabbets.
(17) 134-137 Rabbeting.

f. Cut chamfers, tapers and bevels.
(14) Cutting special tapers
(17) 133-134 Cutting tapers.
(17) 136-137 Beveling and chamfering.

III. To know how to operate the circular saw.

(18) 119:75 Sept., 1931 Joint cutting on a power saw.

(15) 21:305 Oct., 1932 Circular saws, their characteristics and use.
(15) 21:331 Nov., 1932 Circularsaws, their characteristics and use.
(15) 21:357 Dec., 1932 Circular saws, their characteristics and use.
(15) 22:84 Feb., 1933 Circular saws, their characteristics and use.
(15) 22:154 Mar., 1933 Circular saws, their characteristics and use.
(15) 23:76 Feb., 1934 Circular saws, their characteristics and use.

a. To know the safety rules for operating the saw.
(2) 35-36 Using the circular saw.
(17) 41-42 Safety rules for the saw.
(18) 116-85 May, 1930 Caring for the circular saw.
(15) 25:60-7 Feb., 1936.

b. Sawing bevels and chamfers.
(17) 48-51 Sawing bevels and chamfers.

c. Be able to rip and cross cut on the saw.
(2) 32.
(17) 43 Ripping on a circular saw.
(17) 55-58 Cross cutting to length.

d. To be able to cut grooves.
(2) 35 Grooving head.
(2) 83 Cutting grooves, dadoes and rabbets with a circular saw.
(17) 53-54 Rabbeting.
(17) 58-62 Grooves and dadoes.

e. To be able to cut dadoes.
(2) 34 Directions for setting up a dado head.
(2) 83 Cutting grooves, dadoes and rabbets with a circular saw.
(17) 58-62 Grooves and dadoes.

f. To be able to cut tenons.
(14) 122 Cutting tenons.
(2) 99-102 Cutting tenons on circular saws.
(17) 67-72 Cutting tenons.

g. To be able to cut miters.
(17) 62-72 Mitering on the circular saw.

h. To be able to cut tapers.
(2) 77-78 Tapering legs on the circular saw.
(17) 51-52 Sawing tapers.

i. To know how to sharpen a circular saw.
(2) 63-66 Sharpening circular saws.
(15) 22:200 May,1933.
(15) 22:242 July, 1933.
(15) 22:331 Oct., 1933.

j. To know how to cut dovetails and lock joints on the circular saw.
(18) 117:132 Oct., 1930 Lock joints on the circular saw.
(17) 76-77 Cutting dovetails on the circular saw.

IV. To know how to operate the band saw.

a. Safety rules for the band saw.
(14) 125 Guarding the band saw.
(17) 86-87 Safety rules for the band saw.
(15) 27:127 Apr., 1932.

b. To be able to care for and adjust the saw.
(2) 67-68 Sharpening band saws.
(17) 87-89 Coiling band saw blades.
(17) 102-103 Applying band saw tires.

c. To be able to saw curves.
(17) 90-93 Sawing simple curved outlines.
(17) 93-94 Sawing cabriole legs.
(17) 95-96 Sawing curved rails or drawer fronts.
(17) 96-97 Sawing circular disks and segments.

d. To be able to resaw on the band saw.
(17) 100 Resawing.

e. To be able to cut tenons on the band saw.
(17) 101 Making tenons on the band saw.

V. To know how to operate the surfacer.

a. Care for and adjust the surfacer.
(2) 41-44 The planer or surfacer.
(17) 147 Operating the surfacer.
(18) 118:93 Jan., 1931 How to get the most out of your planer.

b. Safety.
(15) 25:60-67 Feb., 1936.

VI. To know how to operate the turning lathe.

a. Safety rules for operating the lathe.
(15) 25:60-67 Feb., 1936 Safety for woodworking machines.
(15) 21:91 Mar., 1932.

b. Adjust and care for the lathe.
(2) 140-144 The lathe and its parts.
(13) 11 Care of the lathe.
(18) 118:128 June, 1931 How to develop your skill in wood turning.

c. To center stock in the lathe.
(2) 144-146 To center and clamp stock in the lathe.
(13) 19-21 Centering.
(18) 118:94 June, 1931 Locating blind centers.

d. To rough down with a gouge.
(2) 147-148 To turn a plain cylinder.
(8) 218 Roughing down work.
(12) The gouge used as a roughing tool.
(13) 22 The roughing cut (large gouge).

e. To know how to smooth with a skew.
(2) 149-176.
(8) 218.
(12) 17-18 Skew used to turn a cylinder.

(13) 23 The smoothing cut (large skew).

f. Laying off pattern on the piece.
(13) 24 Measuring for length.

g. Use of the cut-off tool.
(2) 149.
(13) 26 Cutting off (small skew).

h. Cutting shoulders with the skew.
(8) 220 Illustration.
(12) 18-20 Squaring ends with a skew.
(12) 22 Inside square corners with a skew.
(13) 25-26 Squaring ends with skew and parting tools.
(13) 59-62 Practice cuts.

i. To cut tapers with a skew.
(2) 153 To make tapers.
(12) 20 Cutting tapers or a long V cut with the skew.
(13) 27 Taper cuts.
(18) 118:124 Jan., 1931 Secret of long slender turnings.

j. Cutting beads or convex surfaces with a skew.
(2) 155.
(15) 24-25 A skew chisel for making convex or bead cuts.
(13) 74-77.

k. Scraping with a diamond-point and scraping tool.
(13) 46-47 Scraping tools.

l. Cutting concave curves with a gouge.
(8) 221 Illustration.
(12) 25-26 The gouge to make concave cuts.
(12) 27 The gouge to make convex cuts.
(13) 29 Concave cuts.

m. Mounting work on a face-plate.
(12) 28-34 Face-plate and chuck turning.
(13) 39 Methods of fastening stock.
(2) 162-163 Chuck turning.

n. Mounting screw-chuck work.
(12) 29-31 Screw-chuck turning.

o. To size work on a face-plate.
(13) 41 Roughing off corners.
(13) 43 Laying off measurements.
(13) 47 Internal boring.

p. Fastening pieces together temporarily for turning.
(2) 164 To do split turning.
(18) 119:107 Nov., 1931 Hints for gluing stock for turning.

q. Sandpapering on the lathe.
(2) 156 Sanding with a spindle.
(2) 161 Sanding on a disk.

r. Applying finish on the lathe.
(12) 35 Finishing and polishing.
(13) 36 Finishing and polishing.

s. Set up for duplicate parts.
(13) 35 Duplicate parts.

t. Sharpening turning tools.
(2) 60-63 Sharpening turning tools.
(2) 60 Sharpening the gouge.
(2) 61 Sharpening the square nose.
(2) 61 Sharpening the skew.
(2) 61 Sharpening the cut-off tools.
(18) 118:94 Grinding and honing the turning tools.
(2) 62 Sharpening the round nose.
(13) 15-18 Sharpening the turning tools.

VII. To know how to use the jig saw.

a. Caring for the jig saw.
(17) 106-108 Description of the saw.

b. Blades to use for various work.
(17) 109 The saw blades.

c. Range of work that can be done on the jig saw.
(17) 111 Inside and outside scroll sawing.

(17) 111-112 Intarsia sawing on the saw.
(17) 112-113 Marquetry designs.
(17) 114 Saber sawing, filing, and sanding.

VIII. To know how to use the shaper.
(17) 166-167 Operation of a shaper.

a. Rabbeting and grooving.
(17) 169-170 Making grooves and rabbets on straight stock.

b. Making mouldings.
(17) 170-172 Making straight moulded edges.
(17) 174-175 Shaping curved edges.

c. Doing fluting and reeding on the shaper.
(17) 181-183 Reeding and fluting.

d. Making the rule joint.
(17) 172-174 The rule joint.

e. Safety.
(15) 25:60-7 Feb., 1936 Safety for woodworking machines.

Suggested Projects

The following is a list of suggested projects taken from an extensive list compiled by Ed Davis, Head of the Industrial Arts Department at the Fort Hays Kansas State College at Hays, Kansas. This list was added to from the list of reference books covered in this study.

The same references were used in making this list that were used in the preceding pages, therefore they will have the same identification numbers.

This list is divided into units according to the manipulations necessary to complete the project.

Unit I.

Simple Straight Line Pieces

Material squared to two dimensions. Projects are made of one or more pieces. Butt joints are used.

1. Small tack or nail box.
   (20) 29: July, 1928.

2. Bench hook.
   (20) 27:341 April.

3. Bird houses.
   (16) 5:26 May and June.
   (18) 78--April, 1926.
   (13) 108--April, 1931.
   (15) 24:128 April.

4. Book ends.
(15) 24:128.
(2) 252-253.

5. Clock cases.
(18) 260--July, 1926.
(18) 100--June, 1928.

6. Swings.
(18) 86--July, 1927.
(19) 24 Swing board.

7. Bread board.
(19) 31.

Unit II.

Simple Carved Pieces

Assembled with nails, screws and glue. Butt joints are used.

1. Book ends.
(15) 13:47.
(20) 28:27.
(15) 19:252 June, 1930.

2. Tie rack.
(15) 25:29.

3. Shoe shining cabinet.
(15) 8:78.
(15) 21:36.

4. Magazine basket.
(20) 29:263 Jan.
(20) 34:89.
(20) 29:165 Nov.

5. Hobby horse or other toys.
(16) 1: 3 May or June.
(16) 3:38 May and June.
(15) 15:294.

6. Sleeve board.
(8) 193.

Unit III.

Simple Pieces Made By Squaring Two Or Three Dimensions

Assembled with rabbeted, dado or house joints.

Glue, nails or screws are used.

1. Book stall or ends.
   (16) 2:231 Sept.
   (2) 252-253.

2. Small box.
   (18) 82---1926.
   (18) 113--Sept., 1926.
   (18) 100--Sept., 1926.
   (11) 137-145.

3. Flower boxes.
   (18) 82--Nov., 1926.
   (18) 85--1927.

4. Scrap basket.
   (11) 35-57.

5. Footstool.
   (15) 19:75 Feb., 1930.

6. Smoking stand.
   (15) 22:153 Mar., 1933.

Unit IV.

Open Cabinet Construction

Pieces with solid pieced sides. Gained, butt or dado joints.

1. Wall book racks.
   (18) Jan., 1927.
   (18) Oct., 1933.
   (15) 19:117-118 Mar., 1930.
   (15) 22: Supplement No. 261 Mar., 1933.

2. Wall dish racks.
(18) 103--Nov., 1926.

3. Magazine racks.
(20) 54:89 Oct.
(18) 100--April, 1928.
(18) 94--Dec., 1934.
(15) 24: Supplement No. 309, April, 1935.

4. Pier cabinets.
(18) May, 1927.
(18) 119--Dec., 1929.
(20) 29:245 Jan.
(20) 34:36 Oct.
(20) 33:98 Jan.
(15) 23:19 Jan., 1934.

5. Handy rack.
(18) 110--Mar., 1930.

6. Sewing cabinet.
(20) 29:435 May, 1927.

7. Wall shelf.
(20) 33:250 Mar.

Unit V.

Open Cabinet Construction

Constructions having paneled sides.

1. Pier cabinets.
(18) 107--Dec., 1931.

2. Open book cases.
(18) 96--Jan., 1927.

3. Hanging lantern.
(11) 147-152.

Unit VI.

Mitered Frame Construction

1. Picture frames.
   (18) 78--Dec., 1926.
   (18) 113--Sept., 1926.
   (11) 65-68.

2. Screens.
   (18) 88--Oct., 1930.
   (18) 89--Nov., 1930.
   (20) 29:189 Nov.

3. Chippendale mirror.
   (16) 4:131.

4. Mirror on stand.
   (15) 37:215 June, 1933.

Unit VII.

Box Or Chest Construction

Using butt and rabbeted, miter, dado, tongue and groove, dovetail or doweled corners.

1. Small fancy boxes.
   (18) 84--July, 1931.
   (18) 94--Mar., 1931.
   (8) 189.

2. Cedar chests.
   (20) 29: July.

3. Walnut chests.
   (18) 94--Aug., 1927.
   (15) 15:141.
   (2) 300-302.

4. Tool boxes.
   (18) 91--June, 1926.
   (15) 19:203 May, 1930.

Unit VIII.

Tapered Or Hopper Construction

1. Pedestals.
   (18) 124--Jan., 1934.

2. Waste baskets.
   (20) 33:15 July.

3. Umbrella stand.
   (20) 29:457 June.

4. Candle stick.
   (11) 83-97.

Unit IX.

Solid Cabinet Construction

Cabinets having solid sides. The front is closed with doors or drawers or both.

1. Medicine cabinets.
   (18) 87--June, 1926.
   (18) 115--July, 1931.
   (15) 7:241.

2. Wall cabinets.
   (18) 13:368.
   (18) 128--June, 1927.
   (16) 5:288.

3. Smoking cabinets.
   (15) 13:368.
   (2) 285-288.

4. Supply cabinets.
   (18) 103--Feb., 1930.

5. Display cabinet.
   (18) 122--Jan., 1931.

6. Book cases.
(18) 117--Dec., 1929.
(8) 202.
(8) 196.

7. Sewing cabinets.
(15) 19:155 Apr., 1930.
(15) 24:26 Jan., 1935.
(15) 22: Supplement No. 257 Jan., 1933.

Unit X.

Cabinet Construction---Paneled Sides

Front closed with doors or drawers or both.

1. Book cases.
(18) 88--Sept., 1926.
(20) 33:98 Oct.
(8) 211.

2. Buffets.
(15) 14:468.
(16) 2:333 Nov.
(16) 1:404 Jan.

3. Music cabinets.
(18) 84--Feb., 1926.
(18) 92--Feb., 1927.

4. Wardrobes.
(15) 8:416.

5. Kitchen cabinets.
(18) 78--Nov., 1926.

Unit XI.

Table Construction

The use of mitered, mortise and tenon, dowel and other joints commonly used in tables.

1. Writing table.
   (20) 29:424 June.
   (16) 414 January.
   (16) 5:48.

2. Center, tilt-top, etc.
   (16) 5:446.
   (20) 29:423 June.
   (20) 33:107 Oct.
   (2) 468:47[illegible].

3. Office table.
   (18) 102--Aug., 1931.
   (18) 84--Mar., 1936.

4. Console table.
   (18) 74--Nov., 1917.
   (11) 12:39[illegible].
   (15) 19:137-138 June, 1940.

5. End table.
   (20) 29:107 Oct.
   (20) 169--Nov.
   (20) 45:87 Oct.
   (2) 276-[illegible].
   (15) 19:36 Jan., 1930.

6. Radio table.
   (20) 29:63 Aug.
   (20) 28:368.
   (20) 28:395.
   (20) 28:415.

7. Gate-leg table.
   (2) 458-463.

8. Bedside table.
(2) 288-295.

9. Coffee table.
(15) 23:19[illegible] May, 1934.

10. Type riter table.
(15) 23:257 Nov., 1934.

Unit XII.

Pieces Involving Upholstery Work

1 Stools.
(18) 108--June, 1927.
(18) 94--Aug., 1924.
(18) 80--Dec., 1923.
(18) 80--Feb., 1923.
(15) 24:14 March.
(15) 19: Supplement No. 307 March.
(15) 19:115-116 March, 1931.
(15) 21:351 Nov., 1935.
(2) 254-258.
(2) 278-280.

2. Benches.
(18) 94-1930.
(18) 126--Oct., 1930.

Unit XIII.

Chair Construction

1. Dining chairs.
(16) 17--May and June.
(16) 4:321.
(15) 19:158 Apr., 1930.
(2) 295-300.

2. Occasional chair.
(16) 5:58.
(16) [illegible]:41.

3. Straight chair.
(18) 73--Nov., 1932.

4. Folding chair.
(15) 21:324 July, 1932.

Unit XIV.

Miscellaneous

1. Farm projects.
(16) 5:16.
(16) 2:25.
(16) 3:34.
(16) 5:135.
(18) 92--Aug., 1930.
(18) 97--May, 1927.
(18) 84--April, 1930.
(18) 86--Jan., 1934.

2. Boats.
(20) 28:391 Nov.
(18) 88--1930.
(18) 9[illegible]--1931.
(18) 74--1932.
(18) 108--1932.
(15) 19:188-189.

3. Trailers.
(16) 5:521.
(18) 104-1930.
(18) 10[illegible]--1930.
(18) 75--193[illegible].
(18) 78--1932.

4. Lawn seats.
(15) 24:182 June, 1933.
(15) 22:199 March, 1933.
(15) 15:257.

Unit XV.

Turned Projects

Projects consisting primarily of turned parts.

1. Candle sticks.
   (18) 82-1930.
   (18) 121--1931.
   (15) 24:165 May, 1935.

2. Tilting mirror.
   (18) 104--1931.

3. Gavels.
   (13) 90-93.

4. Potato masher.
   (13) 96-98.
   (8) 276.

5. Rolling pin.
   (13) 99-100.
   (8) 226.

6. Indian clubs and dumb bells.
   (13) 106-109.
   (8) 231.

7. Drawer pulls.
   (13) 111-114.

8. Match ox.
   (13) 129-131.

9. Pin tray.
   (13) 132-133.

10. Card tray.
    (13) 145-148.

11. Nut bowl.
    (13) 153-156.

12. Cricket stool.
    (15) 24: Supplement No. 106 Mar., 1936.

13. Gate-leg table.
(15) 23:215 June, 1954.

14. Butterfly table.
(15) 22:220 June, 1953.

15. End tables.
(15) 22:263 Aug., 1953.
(15) 22:316 Oct., 1933.

16. Floor lamps.
(15) 22:285 Sept., 1953.
(15) 20:334 Sept., 1931.

Conclusion

The course of study was based upon the results of the questionnaire to the extent that it covers the material to be found in the text books and reference books now available in these schools. It also takes into consideration the number of semesters that woodwork is now offered in those schools, their equipment, and the number of periods per week given to woodwork.

From the questionnaire was drawn several conclusions: (1) that there are several different text books being used in the state of Kansas; (2) that more than thirty-two per cent of the schools are not using text books; (3) that twenty per cent do not have reference books; (4) that there are only eleven schools now using the "state course of study", and that these eleven schools think the course of study is too general to be of much value: (5) that thirty-four percent of the schools are using no course of study; (6) that the schools are fairly well equipped with power machinery, with only about ten per cent without any machinery; (7) that 104 of the 111 schools offer one or two years of woodwork; (8) that there are

1,779 pupils now enrolled in woodwork in the class "B" and "C" high schools of Kansas; (9) that, judging from the results of the questionnaire and remarks from the woodwork instructors, there is a great need for a course of study in Kansas.

At the present time in Kansas there is no special goal or objective toward which to work in the woodworking shops. Instructors have various goals in mind, and thus we have as many systems of teaching and as many different kinds of courses of study as we have schools which offer woodwork.

A pupil moving from one school to another has no idea whether he is prepared to go right ahead with the woodworking class in his new school or whether he will have to do outside work in order to prepare himself to meet the instructor's standards. The instructor must give the pupil review quizzes in order to find out what he has missed that is considered essential under the instructor's course of study.

The organization of the course of study consists of four units of study. Each unit takes up one phase of woodwork. These units are not supposed to be taught alone but are grouped into units for the convenience of the instructor and the pupils. These units must

be used as a whole to get the intended results. In making a project the "Bench Work" unit must be used in constructing the project; if machinery is used the "Machinery" unit must be used, and if the project requires upholstering, the "Upholstering" unit comes into use. In this way the four units are connected into one body.

No attempt has been made to include material for study in this course of study. The purpose of this course is to offer an outline that can be followed by the instructor, but in such a way that at the end of the course his pupils will have covered such work as, at the present time, is deemed necessary for a complete course in woodwork.

The material in this course is so arranged that it can be altered to fit the individual teacher and also takes into consideration the individual differences of the pupils in woodwork. It is also so arranged that it can be used in the "Teacher's Choice" method of selecting projects or that it can be used just as effectively in the "Pupil's Choice" method.

It is the writer's hope thatthis course will lead to more effective courses of study in Kansas, that it

will serve to bring the woodworking departments closer together as far as teaching the same subject matter is concerned, and that the instructors will find it to be of some benefit to them and to their pupils as well.

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