

STANDARDS FOR THE
VOCATIONAL CARPENTRY PROGRAM
IN OKLAHOMA

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IN OKLAHOMA**

By

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THESIS AND ABSTRACT APPROVED:



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CHAPTER I

STATEMENT OF PROBLEM

Since trade and industrial education is rather a broad field providing educational services to both high school students and adults in all fields classified as trade and industrial pursuits, there are many opportunities for confusion and misunderstandings. The writer, having been engaged in the supervision of this program for several years, has experienced a need for some descriptive literature outlining the standards for each individual type class.

This study is an attempt on the part of the writer to assemble such information as might be needed by a school administrator to establish and maintain a vocational carpentry program of high standards.

PURPOSE OF THE STUDY

The major objectives of this study are: first, to analyze the Oklahoma State Plans for Vocational Education and the Federal Policy bulletins to ascertain specifically the requirements for the use of Federal and State funds in a vocational carpentry program; and second, to prepare material for a bulletin outlining the policies and standards for such a program.

NEED FOR THE STUDY

While working as a supervisor of trade and industrial education the writer has recognized a need for descriptive literature describing the standards and procedures as recommended by the Oklahoma State Board for Vocational Education for the operation of each individual type of trade and industrial program. Although vocational education had its beginning in 1917, with the passage of the Smith-Hughes Act, there is not sufficient descriptive material available to send to a superintendent of schools in answer to his request for information about the many programs being offered at present. The writer does not suggest that a bulletin would take the place of a personal visit, but merely that some detail material should be left for a superintendent to read. Usually a visit is too short to discuss all of the problems involved.

A study made by Ernest Carter revealed a definite need for some written material prescribing standards for the programs. Mr. Carter states:

One of the sad things about the functions of administrators in maintaining standards is that there is not a very definite and complete set of standards available for the program. A few things such as the length of the periods have been set, but a great deal that goes on during the class is still more or less a mystery to them.¹

¹Carter, Ernest, Functions of School Administrators in Operating A Trade and Industrial Program, Oklahoma A. & M. College, 1949, p. 19.

TABLE I

**A SUMMARY OF MATERIAL AND LETTERS RECEIVED
FROM OTHER STATES IN COMPLIANCE WITH THE WRITERS
REQUEST FOR INFORMATION AND MATERIAL**

State Replying	Material Received	Comments in Letter
Alabama	A Camera Story	Administrator's handbook in process
Arkansas	Diversified Occupations Bulletin	Others in process
Arizona	None available	Please send your bulletin
California	Vocational Education in Action Procedure for Operation Shop Suggestions	Others in process
Colorado	Leaflet	Enclosed is leaflet
Florida	A general school bulletin A picture bulletin	Others in process
Idaho	None available	Believe bulletins are needed
New Hampshire	None available	Hope to develop soon
Nevada	None available	Sorry none available
Ohio	Diversified occupations bulletin	No other available
Oregon	Equipment lists and brief standards	Working on similar project
Pennsylvania	State-Local Plan	Just completed--now on trial
South Carolina	None available	Bulletin in process
South Dakota	Diversified occupations bulletin	Enclosed is bulletin
Tennessee	None available	Considering problem
Texas	Mimeographed circulars	Others in process
Utah	None available	Bulletin in process
Washington	General shop suggestions and tool lists	Developing manual
West Virginia	None available	Bulletins ready soon
Wisconsin	General bulletin	Enclosed is bulletin

DEFINITION AND CLARIFICATION OF TERMS

In order to better understand the limitation of the study and terminology used, the following terms are defined:

Supervision. Although supervision of vocational education includes some administrative responsibilities, the major purpose of supervision is for the improvement of instruction. The term "supervision" will include various activities such as:

Assisting in the planning of state and local programs; assisting teachers in improving methods of instruction; securing facilities and conditions which are conducive to effective training; and evaluating the results of the instruction.²

Trade and Industrial Education. Trade and industrial education is a phase of vocational education of less than college grade organized to provide instruction in:

1. Any industrial pursuit, skilled or semi-skilled trade, craft, or occupation which directly functions in the designing, producing, processing, assembling, maintaining, servicing or repairing of any manufactured product.
2. Any service trade or occupation which is not classified as agricultural, business, professional, or homemaking.
3. Other occupations which are usually considered as technical and in which workers such as nurses, laboratory assistants, draftsmen, and technicians are employed.³

²Federal Security Agency, Administration of Vocational Education, Office of Education, Washington, D. C., Bulletin No. 1., Series No. 1, Revised 1948, p. 21

³Ibid., p. 61

Standards. A standard is something set up as a rule for measuring or as a model.⁴

The writer does not suggest a set of standards that must be lived up to in every detail but merely something to be used as a guide.

Experience has taught the writer not to compare a program in one town with a program in some other town.

The writer also realizes that it is impossible to get a one hundred per cent approval to any set of standards.

All-day Trade Courses. All-day trade training is given to persons regularly enrolled in a full-time school who have selected a trade or industrial pursuit, and who wish to be prepared for useful employment in that pursuit. The training is comprehensive and includes instruction in manipulative processes and also in those technical and other related subjects which are needed by the skilled and competent worker.⁵

PREVIEW OF THE REMAINDER OF THE THESIS

The remainder of Chapter I includes the limitation of the study, source of data, and the investigational procedure.

Chapter II contains pertinent general information necessary to establish a background for a complete understanding of vocational education. This chapter deals with the principles and policies of vocational education as stated in the *Federal Vocational Education Bulletin No. 1, Administration of Vocational Education.*

⁴Webster's Dictionary.

⁵Federal Security Agency, op. cit., 69.

Chapter III presents general information about trade and industrial education as a part of the total vocational education program.

Chapter IV is the main body of this study. In this chapter the writer attempts to put into writing the necessary information to establish and maintain a vocational carpentry program in accordance with the Oklahoma State Plans for Vocational Education and the Administration of Vocational Education of the U. S. Office of Education. The writer has consulted frequently with the State Supervisor of Trade and Industrial Education, the Head of the Department of Trade and Industrial Education, Oklahoma A. and M. College and the vocational carpentry teachers in Oklahoma for information and opinions on matters not specifically covered in the Oklahoma State Plans and the Federal Policy Bulletins.

Chapter V contains specific information for schools that are in the planning stage of a program. The part of the chapter headed "General Suggestions for Housing and Equipping a Vocational Shop" is the results of a nation-wide study conducted by the Bureau of Trade and Industrial Education, Sacramento, California.

Chapter VI briefly summarizes the material in the previous chapters. It also presents conclusions and recommendations developed as a result of the study.

LIMITATIONS OF STUDY

This study is being limited to the carpentry programs that are Federally aided under the provisions of the Smith-Hughes and George-Barden Acts and administered through the Oklahoma State Board for

Vocational Education.

Because of the similarities in the procedure of operation, other day-trade programs are not included in this study.

SOURCE OF DATA

The data for this study was secured from carpentry teachers, principals, superintendents, local supervisors, state supervisors, directors, labor groups, management groups, text and reference books, and Federal and State releases.

The writer has had the privilege of visiting all of the carpentry programs in the State and has discussed this problem with superintendents, principals, and teachers on many occasions.

The writer has worked with joint apprenticeship committees in connection with the related training program for carpenter apprentices and has used the apprentice training outline as a criterion for developing the training outline for the trade and industrial carpentry program.

The writer has conducted several conferences with the carpentry instructors where this problem was the main topic of discussion.

Letters were written to all of the State Supervisors in the United States requesting information and material on this subject.

INVESTIGATIONAL PROCEDURE

Approach. After the problem was selected and outlined, a list of state supervisors of trade and industrial education of all the states in the United States of America was secured and letters were written to each

state supervisor requesting bulletins setting forth the standards for each individual type of program. Copies of their promotional material such as pamphlets, bulletins, and leaflets that explain the organization and operation of classes were requested.

A revised copy of the Federal policy bulletin entitled Administration of Vocational Education, revised 1948, was secured. Textbooks on the subject of vocational education were obtained.

Conferences were conducted with supervisors and teachers to obtain information and opinions on the various topics included in this study.

Visits were made to each of the carpentry programs in Oklahoma where considerable information was secured and pictures were made.

Individual conferences were held with each superintendent where carpentry programs are in operation for their opinions and suggestions.

The State Supervisor of Trade and Industrial Education and the Teacher Training Department were consulted frequently for information and interpretations.

Treatment of the Findings. As the material and letters were received, they were examined and each piece of material containing information on the subjects included in this study was listed in the bibliography. Also, a summary of this material is included in this study.

Since the vocational programs in Oklahoma must operate in accordance with the Oklahoma State Plans for Vocational Education and the Federal policy bulletin, Administration of Vocational Education,

most of the topics in this study are supported by quotations from these two references.

The conferences with teachers, supervisors, and superintendents furnished expert advice on equipment, shop buildings, and project standards.

CHAPTER II

INTRODUCTION TO VOCATIONAL EDUCATION

Vocational education includes four divisions as follows: (1) Agricultural Education, (2) Distributive Education, (3) Home Economics and (4) Trade and Industrial Education.

The vocational education program was begun in 1917 with the passage of the Smith-Hughes Act and is now operated under the Smith-Hughes and the George-Barden Acts. These acts provide funds which are to be used for the promotion and development of vocational education of less than college grade. This plan for development of vocational education is based on two fundamental ideas:

(1) That vocational education is a matter of national interest and essential to the national welfare, and (2) that Federal funds are necessary to stimulate and assist the States in making adequate provisions for such training.¹

The writer has included excerpts from the Federal policy bulletin, Federal Security Agency, Office of Education, Washington, D. C., Administration of Vocational Education, Bulletin, No. 1, General Series No. 1, Revised 1948, necessary for a clear and complete understanding of the underlying principles of the vocational education program. The titles of the excerpts are as follows: The Purpose of Vocational Education.

¹Federal Security Agency, op. cit., p. IV.

Persons for Whom Vocational Education is Intended, Education of Less Than College Grade, Public Supervision or Control, The Organization of the State Board for Vocational Education and The State Plan--an Agreement Between a State Board for Vocational Education and the Office of Education.

THE PURPOSE OF VOCATIONAL EDUCATION

The purpose of vocational education is to provide training, to develop skills, abilities, understandings, attitudes, working habits, and appreciations, and to impart knowledge and information needed by workers to enter and make progress in employment on a useful and productive basis. Vocational education is an integral part of the total education program. It makes a contribution toward the development of good citizens, including their health, social, civic, cultural and economic interests.

The controlling purpose of vocational education, as stated in the Smith-Hughes Act, is "to fit for useful employment." The needs of two distinct groups of people were recognized by stating that the education provided shall be designed to meet the needs of persons over 14* (see footnote) years of age who are preparing for, or who have entered upon, the work of various occupations. Vocational education is intended to meet the training needs of persons who are preparing for employment and to supplement or extend training for those who are employed. These training opportunities should not be restricted to young persons who enrolled in the regular day schools but should be extended to serve all out-of-school youth and adults, both employed and unemployed, who are in need of the kinds of training which can be provided best in organized classes.²

²Federal Security Agency, op. cit., p. 1

*Oklahoma State Plans for Vocational Education, p. 136,
"Students admitted to these classes must be 16 years of age or over."

PERSONS FOR WHOM VOCATIONAL EDUCATION IS INTENDED

The fact should be emphasized that schools and classes are fostered under the vocational education acts for the purpose of giving vocational training to individuals to the end that they may be effectively prepared to enter or advance in profitable employment. Admission to any vocational class should be based upon evidence that the applicant can benefit by the instruction to be given in that class, and that he possesses the qualifications required for the successful utilization of the training in that given type of work.

The extent of the general education which a person has secured frequently has little bearing on the work to be done in a given occupation. The completion of a certain amount of academic training is not, in itself, a satisfactory method of selecting persons to be trained. Entrance to a vocational class should be based, principally, upon three factors:

1. The desire of the applicant for the vocational training offered;
2. His probable ability to benefit by the instruction to be given; and
3. His chances of securing employment in the occupation he has secured the training, or his need for training in the occupation in which he is already employed.³

EDUCATION OF LESS THAN COLLEGE GRADE

One of the conditions of the Smith-Hughes Act is that the funds provided for vocational instruction may be used only for education which is "of less than college grade." A program of vocational education is considered to be of less than college grade when all of the following conditions are met:

1. The objective is to provide training which will be advantageous in entering or continuing in employment in specific occupations or fields of work.
2. Admission is based upon the ability of pupils to profit

³Federal Security Agency, *op. cit.*, p. 30.

by the instruction offered rather than upon the possession of secondary school credits required for college entrance.

3. The instruction offered is based upon the needs for workers in the occupation for which training is given.
4. The instruction is terminal in nature and not a part of a course which is to be continued in a college or other higher institution.
5. The instruction does not lead to a baccalaureate degree and is not organized to conform to the requirements of a course which does lead to such a degree.⁴

PUBLIC SUPERVISION OR CONTROL

One guiding principle of the vocational education acts--and it cannot be too strongly emphasized that this principle applies to every phase of activity under these acts--is "that such education shall be given in schools or classes under public supervision or control."

A school or class is considered to be under public supervision or control, within the requirements of the Federal vocational education acts when it meets all of the following criteria:

1. It is organized and operated under the direction of a State or local board responsible for expenditure of public-school funds for vocational education in the State or community.
2. The teachers are paid from public funds in the same way as other public-school teachers employed by the State or local board responsible for vocational education are paid.
3. Officials on the staff of a State or local board responsible for vocational education have full charge of:

⁴Federal Security Agency, op. cit., p. 3

- (a) Selection, salaries, and length of term of the teachers.
- (b) Qualifications and admission of the pupils.
- (c) Content and organization of all courses and curricula.⁵

THE ORGANIZATION OF THE STATE BOARD FOR VOCATIONAL EDUCATION

In order to participate in the benefits of the funds provided by the Federal Acts, the State, through legislative authority, was required to accept the provisions of the acts; appoint a State Treasurer to serve as Custodian of the Vocational Education funds allotted to the State; and create a State Board having all necessary power to cooperate with the U. S. Office of Education in the administration of the Federal Acts.

The State Board for Vocational Education, through its executive officer, shall perform the following duties:

1. Prepare a plan giving information about the kinds of vocational education for which the State expects to use Federal funds and submit these plans to the U. S. Office of Education for approval.
2. Maintain State programs of administration, supervision, and teacher training.
3. Provide for the promotion and development of vocational education and for the use of Federal funds.
4. Make annual reports to the U. S. Office of Education on the work done and the receipts and expenditures of Federal funds.⁶

⁵Federal Security Agency, op. cit., p. 3.

⁶Federal Security Agency, op. cit., p. 6.

THE STATE PLAN - AN AGREEMENT BETWEEN
A STATE BOARD FOR VOCATIONAL EDUCATION AND
THE OFFICE OF EDUCATION

Each State is required, under the terms of the Federal Vocational Education Acts, to submit a plan for the vocational education program for which it expects to use Federal funds. This plan, when approved by the Commissioner of Education, becomes a contract between the State and the Federal Government. The plan for a State is initiated by that State and is reviewed by the Office of Education only as it applies to the use of Federal funds in that State. When a provision is included in a State plan for any phase of work in which Federal reimbursement may be involved, such provision shall conform to the Federal acts and the official policies of the Office of Education. Disapproval of any provision does not mean that a State may not adopt or use that provision in its state program; it means that Federal funds may be used only for work covered by the parts of the plan which are approved.

Two basic considerations should be kept in mind in regard to this state plan: (1) The plan is in part a contract between the state and the Federal Government. In this respect certain definite information is required by the statutes. In providing this information the State boards for vocational education describe the conditions under which they will use Federal vocational education funds. (2) The plan is in every other respect a description of what the State expects to do--the program developed by the State to meet its own purposes and conditions. It is set forth in language which clearly implements the underlying policies of the State and suggests means to be used in carrying them out in relation to vocational education. 7

⁷ Federal Security Agency, op. cit., p. 4.

CHAPTER III

THE TRADE AND INDUSTRIAL EDUCATION PROGRAM

The trade and industrial education program is responsible for giving training of two distinct types: "(1) For persons who are preparing for entrance upon the work of a trade and industrial pursuit, and (2) for persons who have entered such employment."¹

The trade and industrial education program in Oklahoma may be further classified as providing training for two distinct groups: (1) For students in the regular day-school program, and (2) for adults.

The regular day-school program includes two types of programs: (1) The trade and industrial program in diversified occupations (hereafter referred to as the D. O. program) and (2) the all-day trade program.

The adult program provides: (1) The related instruction program for apprentices, (2) training for public service occupations, (3) the petroleum industry training program, (4) foremanship training, and (5) other courses for journeymen and other trade and industrial workers not classified above.

Since it is apparent that a large number of people confuse the industrial arts program with the trade and industrial program, the

¹Federal Security Agency, op. cit., p. XII.

writer has included a comparison chart in this chapter to differentiate between the industrial arts program and the trade and industrial program.

The writer has also included several excerpts from the Federal Policy Bulletin, Administration of Vocational Education, Office of Education, Washington, D. C. Bulletin No. 1, Series No. 1, 1948, to assure a complete understanding of the intent of the National acts, under which the trade and industrial program receives Federal aid.

THE PURPOSES OF TRADE AND INDUSTRIAL EDUCATION

The major objectives of trade and industrial education are:

1. To provide instruction of an extension or supplemental type for the further development of performance skills, technical knowledge, related industrial information, safety, and job judgment for persons already employed in trade and industrial pursuits.
2. To provide instruction of a preparatory type in the development of basic manipulative skills, safety judgment, technical knowledge, and related industrial information for the purpose of fitting persons for useful employment in trade and industrial pursuits.²

TRADE AND INDUSTRIAL PURSUITS DEFINED

Training programs may be organized to provide instruction in:

1. Any industrial pursuit, skilled or semi-skilled trade, craft, or occupation which directly functions in the designing, producing, processing, assembling, maintaining, servicing, or repairing of any manufactured product.
2. Any service trade or occupation which is not classified as agricultural, business, professional or homemaking.
3. Any other occupations which are usually considered as technical and in which workers such as nurses, laboratory assistants, draftsmen, and technicians are employed.³

THE ALL-DAY TRADE PROGRAM

All-day trade training is given to persons regularly enrolled in a full-time school who have selected a trade or industrial pursuit, and who wish to be prepared for useful employment in that pursuit. The

²Federal Security Agency, op. cit., p. 61.

³Federal Security Agency, loc. cit.

training given is comprehensive and includes instruction in manipulative processes and also in those technical and other related subjects which are needed by the skilled and competent worker.

The all-day trade training program consists of three types which are commonly referred to as Type A, B, and C. Although all of the day trade programs in Oklahoma are operated as Type B programs, information regarding the Type A and B programs is included.

The Type B all-day trade program in Oklahoma includes the following courses: Automobile Mechanics, Brick Masonry, Body and Fender Repair, Carpentry, Cabinet Making, Cosmetology, Commercial Cooking, Commercial Art, Commercial Sewing, Drafting, Electricity, Home Service, Machine Shop, Maintenance Mechanics, Printing, Radio, Sheet Metal, Shoe Repair, Tailoring, and Welding.

Types of All-day Trade Training

Type A. This type of all-day trade training is one in which the pupils devote one-half of the school day--not less than three consecutive clock-hours--to practical work on a useful or productive basis, with additional time given to instruction in segregated classes in the necessary technical and other related subjects. The instruction in related subjects shall have direct functioning value in the trade or occupation for which training is being given. Training of this kind may be given only in schools which offer instruction extending over at least 9 months per year and 30 hours per week. Reimbursement may be made from either Smith-Hughes or George-Barden funds.

Type B. This type of training differs from the Type A only in the provisions for instruction in related subjects. In a Type B course, the related instruction is not given in segregated classes but by the shop teacher incidental to the shop work. The half day is not to be divided into definite periods for teaching related subjects, but such instruction shall be given as the needs for it arise in the shop work. The school shall be in session at

least 30 hours per week and 9 months per year. Reimbursement may be made from either Smith-Hughes or George-Barden funds.

Type C. This is a special type of all-day preemployment trade training which may be organized for persons over 18 years of age or for those 14 years of age or over who have legally left the full-time school. Such training may be offered for any length of time. The George-Barden Act specifically states that such a class may be operated for less than 9 months per year, for less than 30 hours per week, and without the requirement that a minimum of 50 percent of the school time must be given to shop work on a useful or productive basis. Type C training may be reimbursed from George-Barden funds only. This provision of the George-Barden Act makes it possible to take care of such different situations as follows:

1. A demand for training single-purpose operators. Intensive training can be given to equip learners with the basic skills, technical knowledge, and related industrial information which will enable them to get a job, hold it, and advance in the industrial occupation without regard to attendance 30 hours per week during a 9 months school year.
2. Training opportunity to meet the special needs of persons over 18 years of age who wish brief intensive preparation for entrance at the beginning level into industrial employment. Such training will be less comprehensive and complete than that given in all-day trade preparatory courses.
3. Intensive courses operated 6 to 8 hours per day for relatively short periods of time and organized to prepare trainees for entrance into employment where the special job requirements are of such nature that the equivalent of such training would enable those trained to enter industry and meet definitely explicit job requirements. Preparation for specific jobs that require special testing or inspectional skills, as well as production skills, could be included when justified by local employment opportunities.⁴

⁴Federal Security Agency, *op. cit.*, p. 70.

CONDITIONS NECESSARY FOR REIMBURSEMENT

When Federal funds are used to reimburse a school for trade and industrial education programs, the following facts shall be established:

1. Schools and classes are legally qualified to receive funds under the terms of the Federal acts.
2. Work reimbursed has been conducted in accordance with all provisions of the State plan.
3. Expenditures for which reimbursement is made have already been made for the purposes claimed and in accordance with the provisions in the State plan.
4. Supervision by the State board is maintained in accordance with the State plan.
5. Federal vocational education funds are not used to reimburse for expenditures from any other Federal funds.⁵

COMPOSITION OF CLASSES

No reimbursement may be allowed for classes which enroll both vocational and nonvocational pupils. Vocational pupils are those enrolled in a course or program in which all have a common vocational objective.⁶

THE REIMBURSEMENT OF TRADE AND INDUSTRIAL TEACHERS' SALARIES

The Smith-Hughes and George-Barden Acts both provide funds for reimbursement of trade and industrial teachers' salaries. Such funds must be matched with State and/or local funds.

⁵Federal Security Agency, op. cit., p. 19.

⁶Federal Security Agency, op. cit., p. 34.

The following reimbursement plan was approved by the State Board for Vocational Education for the school year 1949-50.

THE TRADE AND INDUSTRIAL EDUCATIONAL REIMBURSEMENT PLAN FOR OKLAHOMA FOR 1950

A. General Provisions

- a. All local coordinators, day-trade teachers and local supervisors shall be employed for the school year of ten months.
- b. All diversified occupations programs shall be full time programs and the coordinator of such a program shall devote his full time to the trade and industrial program in his immediate school district.
- c. If the local school board of either a state-aided or non state-aided school elects to set the total salary below the amount of total state aid scale, plus the reimburseable scale for which the teacher qualifies, the State Board shall approve for reimbursement only the difference between the total salary set by the local board and the state-aid salary schedule for which the teacher qualifies.
- d. Reimbursement cannot be approved for teachers who also hold positions such as coaches, band directors, superintendents, principals, or other administrative positions.

B. Policy governing reimbursement for half-time day trade programs:

- a. Local boards employing day-trade teachers to teach one three-hour class daily shall be reimbursed 50% of the salary paid for the time spent in trade and industrial work, except as stated in Section C above under General Provisions.

C. Policy governing reimbursement for full-time day trade programs:

- a. Local boards employing day-trade teachers to teach two three-hour classes daily shall receive \$1350 per school year, except as stated in Section C above under the General Provisions.

D. Policy governing reimbursement for trade and industrial programs in diversified occupations:

- a. Local boards employing diversified occupations coordinators shall be reimbursed \$1350. per school year, except as stated in Section C above under General Provisions.

E. Policy governing reimbursement for local supervisors of trade and industrial education programs:

- a. Local boards employing supervisors shall be reimbursed at the rate of 50% of the total salary for time spent supervising trade and industrial programs.⁷

THE STATE PROGRAM OF SUPERVISION

The term "supervision" as used in this bulletin includes the activities which are needed in the promotion, development, maintenance, and improvement of instruction in a given vocational field. These activities will be of various kinds such as: Assisting in the planning of State and local programs; assisting teachers in improving methods of instruction; helping in the planning and preparation of instructional material; securing facilities and conditions which are conducive to effective training; and evaluating the results of the instruction given. Much of the work of supervision is, in reality, on-the-job teacher training given to individual teachers as the needs are recognized.⁸

PLANT AND EQUIPMENT

In order to provide effective instruction, State Boards will determine that the plant and equipment of any school or class are adequate to carry out the purposes for which the school is established.

Instructional equipment and tools should be of the type most effectively used in industry for the trade or occupation for which

⁷Oklahoma State Board for Vocational Education, Minutes of Meeting, July 1949, State Capitol Building, Oklahoma City, Oklahoma.

⁸Federal Security Agency, op. cit., p. 21.

training is offered. The equipment should be adequate for satisfactory instruction in at least the fundamentals of all essential processes involved in the occupation.

The equipment should be installed in a space that is adequate and properly lighted, heated, and ventilated to insure safe and efficient operations. Standards for basic equipment requirements, adequate working space, safe working conditions, and general tool and toolroom facilities should be established with the counsel and advice of a representative advisory committee and conform to occupational standards.

Space for related subjects classrooms, laboratories, drafting rooms, audio-visual aid facilities, as well as for the storage of supplies and projects, semifinished and completed, should be considered in planning shop layouts.

The responsibility for establishing standards for plant, equipment and maintenance rests with State boards and the standards shall be incorporated in the State Plan.⁹

⁹Federal Security Agency, op. cit., p. 34.

CHAPTER IV

STANDARDS FOR VOCATIONAL CARPENTRY PROGRAMS IN OKLAHOMA

In this chapter the writer has outlined the basic requirements for a vocational carpentry course. These requirements are, for the most part, based on the Federal Policy Bulletin, Administration of Vocational Education, Office of Education, Washington, D. C., and the Oklahoma State Plans for Vocational Education.

The specific objectives or course outline is based on an analysis of the carpentry trade and the course outline used for the training of apprentice carpenters.

The equipment list included in this chapter is based on the recommendations of the vocational carpenter teachers of Oklahoma and equipment standards from other states.

Also included in this chapter is a map showing the location of the carpentry programs in Oklahoma and a summary sheet showing the enrollment and the project for each program. Pictures of most of the projects are included in support of statements in this chapter regarding the importance of an ideal training project.

Pictures of the shop building completed in 1949 are included in support of the suggested shop plan which is also included in this chapter.

GENERAL OBJECTIVE

To provide instruction of a preparatory type in the development of basic manipulative skills, safety judgment, technical knowledge and related information for the purpose of fitting persons for useful employment in carpentry.

THE SPECIFIC OBJECTIVE OR COURSE OUTLINE

1. To develop manipulative skills in the use of hand tools used in carpentry.
2. To develop manipulative skills in the use of power equipment as found in industrial shops, such as:

a. Variety saw	h. Skill saws
b. Mortisers	i. Surfacers
c. Jointers	j. Radial arm saws
d. Shapers	k. Drill presses
e. Band saws	l. Lathes
f. Sanders	m. Saw filers
g. Grinders	n. Etc.
3. To develop manipulative skills used in the carpentry trade, such as:

a. Foundations	i. Exterior finishing
b. Floor framing	j. Interior finishing
c. Wall framing	1. Hanging doors
d. Roof framing	2. Window trimming
e. Roofing	3. Building cabinets
f. Putting on siding	4. Finishing floors
g. Flooring	5. Installing hardware
h. Insulating	
4. To develop appreciation and judgment.
5. To develop a general knowledge of materials and their uses, such as: Lumber, hardware, fasteners and finishing materials.

6. To develop a better understanding of the trade by studying such related subjects as: Shop mathematics, drawing, blueprint reading, and city, State and Federal requirements.
7. To develop leadership through shop management training and foremanship training.
8. To develop social and civic understanding through Trade and Industrial Club activities.

TIME REQUIRED TO LEARN THE CARPENTRY TRADE

When learning the carpentry trade as an apprentice, a person is required to spend not less than 2,000 hours a year for a period of four years, or a total of 8,000 hours for completion. The trade and industrial carpentry student is required to spend three hours per day, five days per week for 36 weeks making a total of 540 hours per school year and only 1080 hours for completion of a two year vocational course. This 1080 hours is only a good start and the student must continue his training to become a journeyman carpenter.

The student carpenter, upon completion of the trade and industrial program, should contact the nearest joint apprenticeship committee for the carpentry trade and ask to be examined to determine his apprentice standing and permission to continue his training under the Federal apprenticeship system.

HOURS OF INSTRUCTION

The Oklahoma State Plans for Vocational Education stipulate that day-trade classes are to meet a minimum of three consecutive hours per day, five days per week and 36 weeks per school year. The term consecutive is to be interpreted to mean three consecutive hours without interruption for other classes or lunch periods, etc.

In schools, where only one half-day of vocational carpentry is offered, the course should be offered in the forenoon to avoid conflicts with the athletic program. This is important since both the Oklahoma State Plans for Vocational Education and the Administration of Vocational Education state that Federal funds may not be used to reimburse classes where students are enrolled at irregular hours. Also, no reimbursement may be allowed for classes which enroll both vocational and nonvocational students.

WHO SHOULD BE ENROLLED IN THE CARPENTRY CLASS

Enrollment should be limited to persons who are able to profit from the instruction and who will accept employment upon completion of training. Such persons should be over sixteen years of age and a junior or senior in high school

Students who plan to follow occupations closely related to carpentry such as cabinet making, stair building, furniture manufacturing, etc., should be permitted to enroll in the course; however, this should not be misconstrued to permit students to enroll for general information or

or just so they can fix things around the house, as this would not be in keeping with the intent of the Smith-Hughes Act.

SIZE OF CLASS

The vocational instructor's duties include both the responsibility for quality of workmanship in the building being constructed and the responsibility for a thorough and complete training program. In view of these facts, the maximum number of students enrolled for the carpentry class should be sixteen students per instructor. The minimum beginning enrollment per class for which reimbursement can be allowed is ten students.

CREDITS GIVEN FOR THE VOCATIONAL CARPENTRY COURSE

The State Board for Vocational Education recommends two units of credit per school year for the students who do satisfactory work in the trade and industrial education carpentry courses, or a total of four units for two years of satisfactory work in the course.

THE INSTRUCTION

The vocational carpentry course is operated similar to any laboratory course. The carpentry instructor must first teach the theory and make a demonstration to the students before they are allowed to begin their laboratory work. The carpentry student's laboratory work must be, in every instance, rated as good since the house project must pass certain inspections. Otherwise, the work will all have to be done over

again. Therefore, the vocational instructor must be constantly giving individual demonstrations and instruction to assure good workmanship. Vocational educators believe, "If the student hasn't learned, the teacher hasn't taught."

Each vocational teacher should have available complete written instructional plans as proof of his instructional program. Beginning teachers may secure assistance from the Teacher Training Department for Trade and Industrial Education in preparing their lesson plans and other instructional material.

SHOPWORK ON A USEFUL OR PRODUCTIVE BASIS

Provision for practical shopwork is found in the act itself, and was undoubtedly placed there to prevent the application of Federal funds for vocational education to programs of the manual training type.

A series of models, exercises, or make-believe jobs are entirely unsatisfactory for shopwork in a trade and industrial program. While the importance of doing practical work can hardly be over-emphasized, it is desirable to keep in mind at all times that the shopwork carried on in a trade and industrial program should provide for definite and thorough instruction, adequate practice, and progressive experience. It is not at all uncommon to find situations where the general idea of doing practical shopwork has been abused to a point where it would appear that the pupils are being exploited for the purpose of turning out a large volume of work without much, if any, regard to their progressive training. It is of course necessary to provide for a certain amount of repetitive experience on each class of work done in order to develop the necessary degree of skill; but any procedure which appears to emphasize the large volume of work rather than the thorough and complete training of the pupils should be condemned.

Practical work means work done in a manner comparable with the ordinary practices found in high-grade industrial

establishments. The turning out of individual jobs or projects, such as one library table, one desk, one tool grinder, or one elaborately finished screw driver does not constitute practical work within the meaning of the provisions of the National act, even though the article turned out may be practical and useful. Practical work in a cabinet making shop would ordinarily call for the making of several articles of the same type using commercial methods, machines, and tools in just the same way as they would be used in a furniture factory. One boy in a machine shop making a little tool grinder does not get the type of training which would be of value to him in a production shop. Where such a job is to be done in a vocational machine shop, some article should be chosen which would call for at least a half dozen machines, and then the work should be laid out and performed according to practical shop methods and standards, utilizing jigs and fixtures.

There are virtually no jobs that are done by anyone employed in industry where time is not an important element. Accuracy and quality of work are likewise important, but in a trade and industrial program it should be remembered that the pupils are there for the purpose of developing certain habits of work and these habits which will make for success on a practical job should be given full consideration. Oftentimes there is a tendency to emphasize accuracy regardless of time. In this connection it should be remarked that accuracy is purely a relative term. The important thing on a practical job is to turn out the work as accurately as necessary.¹

THE CARPENTRY INSTRUCTOR'S QUALIFICATIONS

Trade Experience The state plan requires carpentry instructors to have two years of trade experience beyond the learning period. This means carpentry teachers must have a total of six full years of training and experience at the carpentry trade.

¹Federal Board for Vocational Education, Trade and Industrial Education Organization, Administration and Operation, Office of Education, Washington, D. C., Bulletin No. 17, Series No. 1, p. 89-90.

Professional Training. Carpentry teachers must pursue the five courses of trade and industrial teacher training as follows:

1. History and philosophy of vocational education
2. Trade and job analysis
3. Instructional procedures and techniques
4. Organization and management of school shops
5. Instructional planning ²

Teachers qualifying for State aid must establish the college credit hours as required by the Oklahoma State Law.

²Oklahoma State Board for Vocational Education, State Plans for Vocational Education, 1947-1952, p. 150.

**TABLE II
LOCATION OF CARPENTRY PROGRAMS
IN OKLAHOMA**



TABLE III
AN ANALYSIS OF THE
VOCATIONAL CARPENTRY PROGRAM
IN OKLAHOMA

1949-50

Town	Number of classes	Enrollment	Training project
White schools			
Bixby	1	19	Home economics building
Broken Arrow	2	29	Home economics building
Broken Bow	2	26	Shop, class rooms and auditorium
Clinton	1	16	8 room duplex
Chickasha	1	18	5 room house
Dewey	1	15	5 room house
Duncan	1	16	5 room house
Hobart	1	16	5 room house
Hugo	2	27	5 room house
Idabel	2	29	Shop building
Oklahoma City	1	10	4 room house
Quinton	1	19	Agriculture building
Sapulpa	1	18	6 car garage
Sayre	1	18	5 room house
Shidler	1	15	4 room house
Separate schools			
Atoka	2	20	Band building
Langston	2	20	Apartment building
Oklahoma City	1	18	
Shawnee	1	17	Cafe building

THE TRAINING PROJECT

The vocational carpentry program is probably the least difficult to operate of any vocational program from the standpoint of efficient and well rounded instruction if a practical building project can be secured. The course of study simply unfolds as the building progresses.

Experience has proven that a five-room frame residence is the most satisfactory project.

There are several important factors to be kept in mind when choosing a training project for the carpentry class:

1. Training should be the sole objective.
2. The project should provide opportunities for training in all of the units in the course outline.
3. The project should be completed during the school year.
4. The project should not be so large that the instructor will be required to rush and not allow him sufficient time for necessary instruction and demonstrations.
5. All new materials should be available for the construction of the project.
6. The project should remain school property or be sold at public auction. All laws governing the disposition of public property must be strictly adhered to.
7. Complete detail blueprints drawn by a licensed architect should be available.
8. The project should meet the minimum requirements for an F.H.A.

loan.

9. **Building permits and other codes must be obtained or complied with.**
10. **The advice and support of carpenters, contractors, electricians, plumbers, lumber dealers and other building material suppliers should be secured.**



HOME ECONOMICS BUILDING
Bixby, Oklahoma



HOME ECONOMICS BUILDING
Broken Arrow, Oklahoma



AUDITORIUM
Broken Bow, Oklahoma



DUPLEX
Clinton, Oklahoma



FIVE ROOM HOUSE
Duncan, Oklahoma



FIVE ROOM HOUSE
Dewey, Oklahoma



SIX ROOM HOUSE
Hugo, Oklahoma



FIVE ROOM HOUSE
Hobart, Oklahoma



FIVE ROOM HOUSE
Sayre, Oklahoma



FOUR ROOM HOUSE
Shidler, Oklahoma



SEVEN CAR GARAGE
Sapulpa, Oklahoma



BAND BUILDING
Atoka, Oklahoma



APARTMENT BUILDING
Langston University
Langston, Oklahoma

THE QUALITY OF WORK DONE

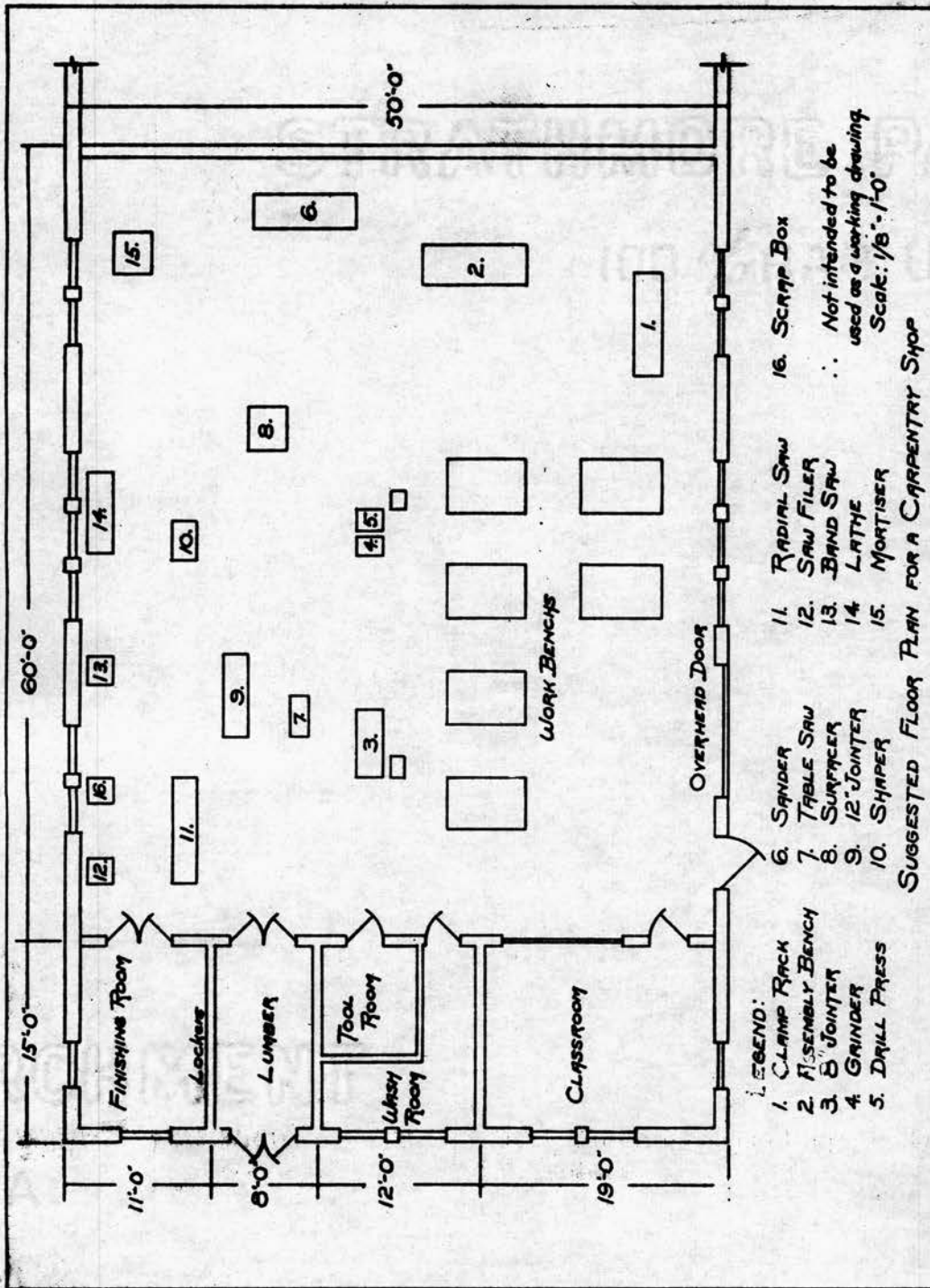
Since the carpentry instructor is training students in the fundamentals of carpentry, his methods of doing the job and his workmanship must be absolutely correct. Wrong methods and poor workmanship would establish poor habits which would be worse than no training at all.

Occasionally some material will be spoiled and more new material will be required; however, the good instructor who has his program well planned will not have too much wasted material. Too many students in a class sometimes is the cause of wasted materials.

In the final analysis a poorly built house indicates that the training the students received was poor, and likewise, a well built house indicates that the training was good.

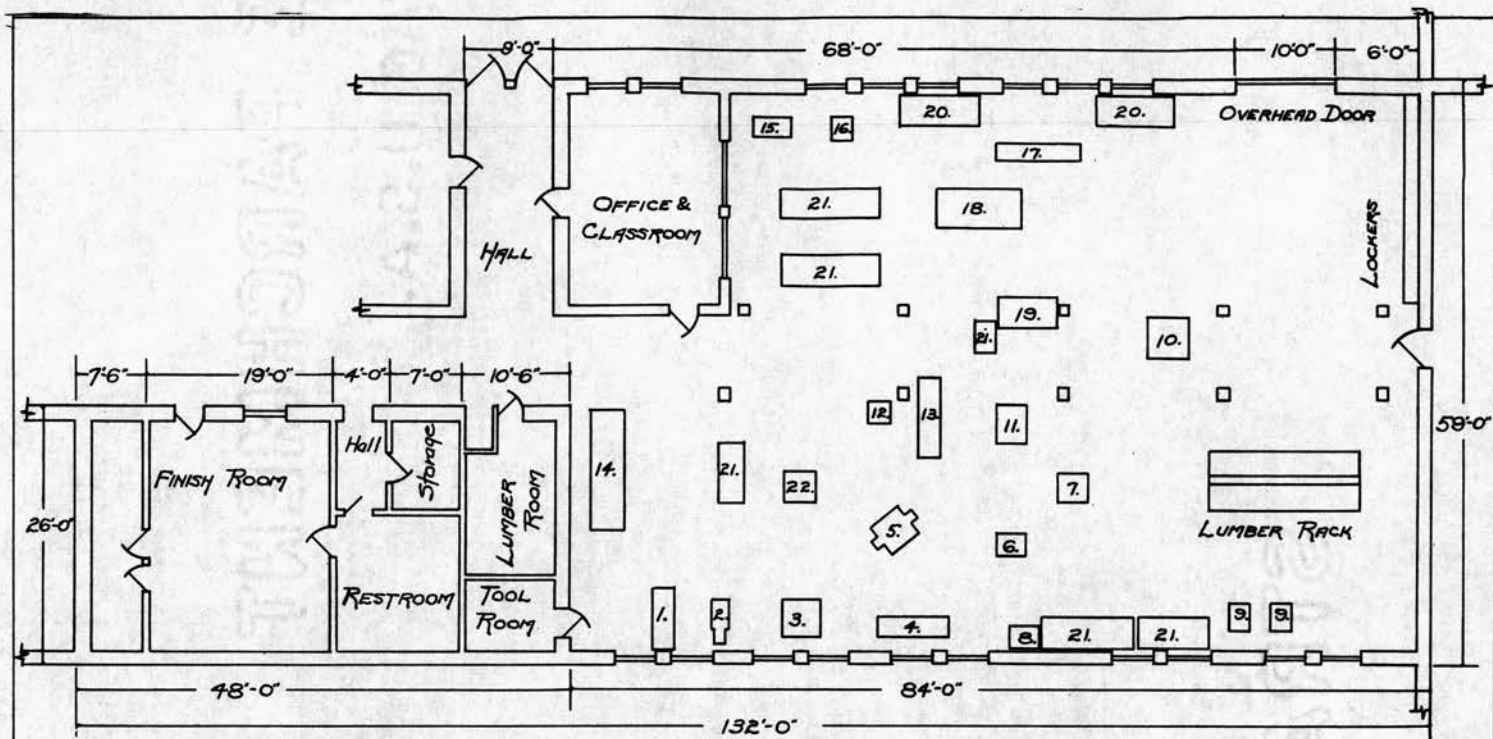
THE CARPENTRY SHOP BUILDING

The carpentry shop building should be a one story building preferably a wing attached to the total educational plant. It should have approximately 3,000 square feet of open shop space with additional space for a class room, tool room, storage room, finishing room and toilet facilities adjoining. This shop should have heating and electrical facilities which are independent of the main school plant. This shop should be accessible for adult evening school use. Also, it must be accessible for lumber trucks and other suppliers.





CARFENTRY SHOP
Broken Bow, Oklahoma



LEGEND:

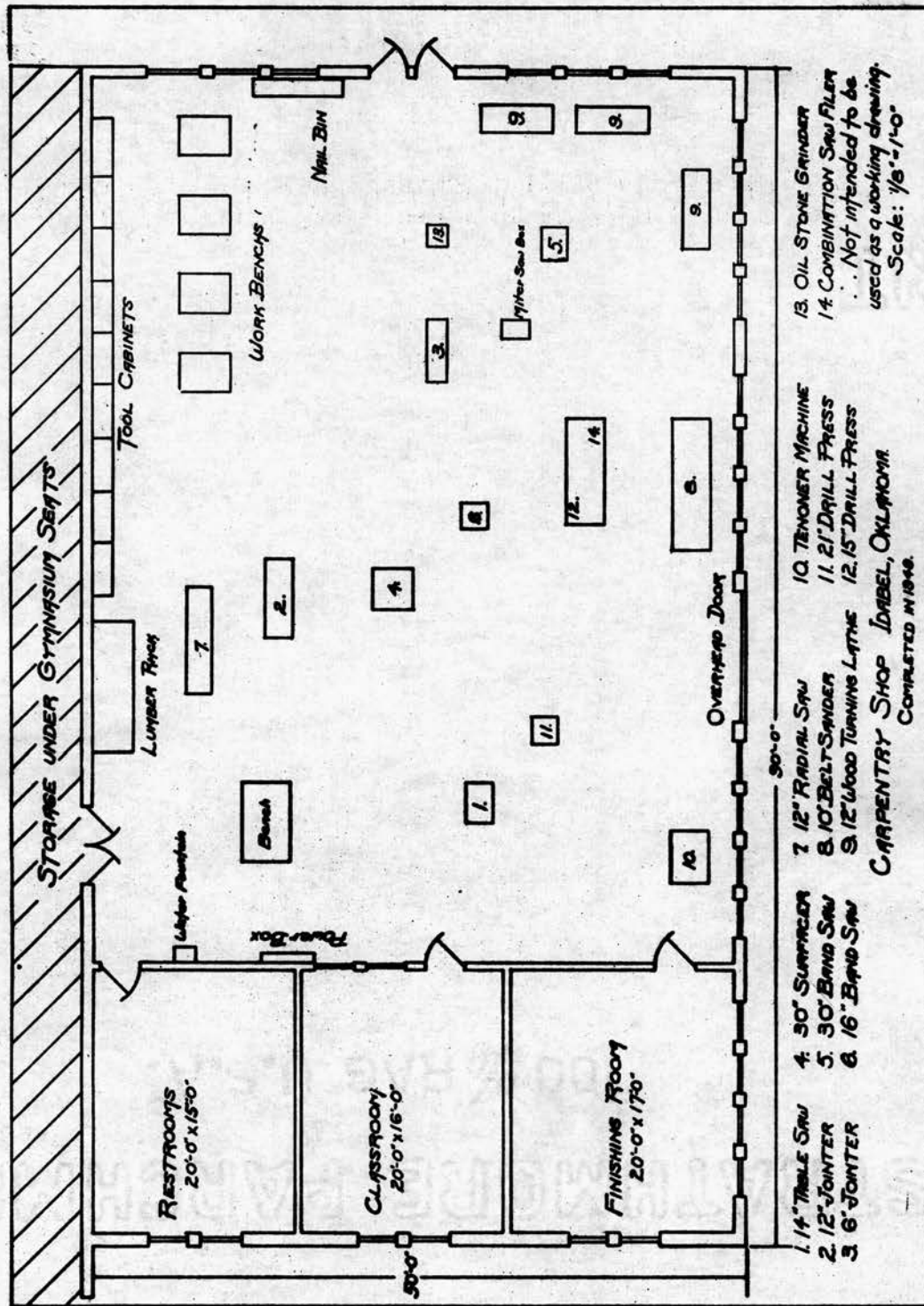
- | | | | |
|--------------------------|-------------------|-----------------|-------------------|
| 1. 12" LATHE | 7. COMBINATION | 13. RADIAL SAW | 20. ASSEMBLY |
| 2. 30" BAND SAW | Saw and JOINTER | 14. BELT SANDER | 21. WORK BENCH |
| 3. HOLLOW CHISEL | 8. BENCH GRINDER | 15. LATHE | 22. 14" TABLE SAW |
| MORTISER | 9. DRILL PRESS | 16. JIGSAW | |
| 4. 12" JOINTER | 10. 40" SURFACER | 17. CLAMP RACK | |
| 5. 6" JOINTER | 11. 16" BAND SAW | 18. GLUE TABLE | |
| 6. SINGLE SPINDLE SHAPER | 12. 10" TABLE SAW | 19. BELT SANDER | |

∴ Not intended to be
used as a working drawing.
Scale: 1/8" = 1'-6"

CARPENTRY SHOP - BROKEN BOW, OKLA.
COMPLETED IN 1949



CARPENTRY SHOP
Idabel, Oklahoma



- 1. 14" TABLE SAW
 - 2. 12" JOINTER
 - 3. 6" JOINTER
 - 4. 30" SURFACER
 - 5. 30" BAND SAW
 - 6. 16" BAND SAW
 - 7. 12" RADIAL SAW
 - 8. 10" BELT SANDER
 - 9. 12" WOOD TURNING LATHE
 - 10. TENONER MACHINE
 - 11. 21" DRILL PRESS
 - 12. 15" DRILL PRESS
 - 13. OIL STONE GRINDER
 - 14. COMBINATION SAW FILER
- ... Not intended to be used as a working drawing.
Scale: 1/8" = 1'-0"

CARPENTRY SHOP IDABEL, OKLAHOMA
COMPLETED IN 1946



SHOP BUILDING
Poteau, Oklahoma

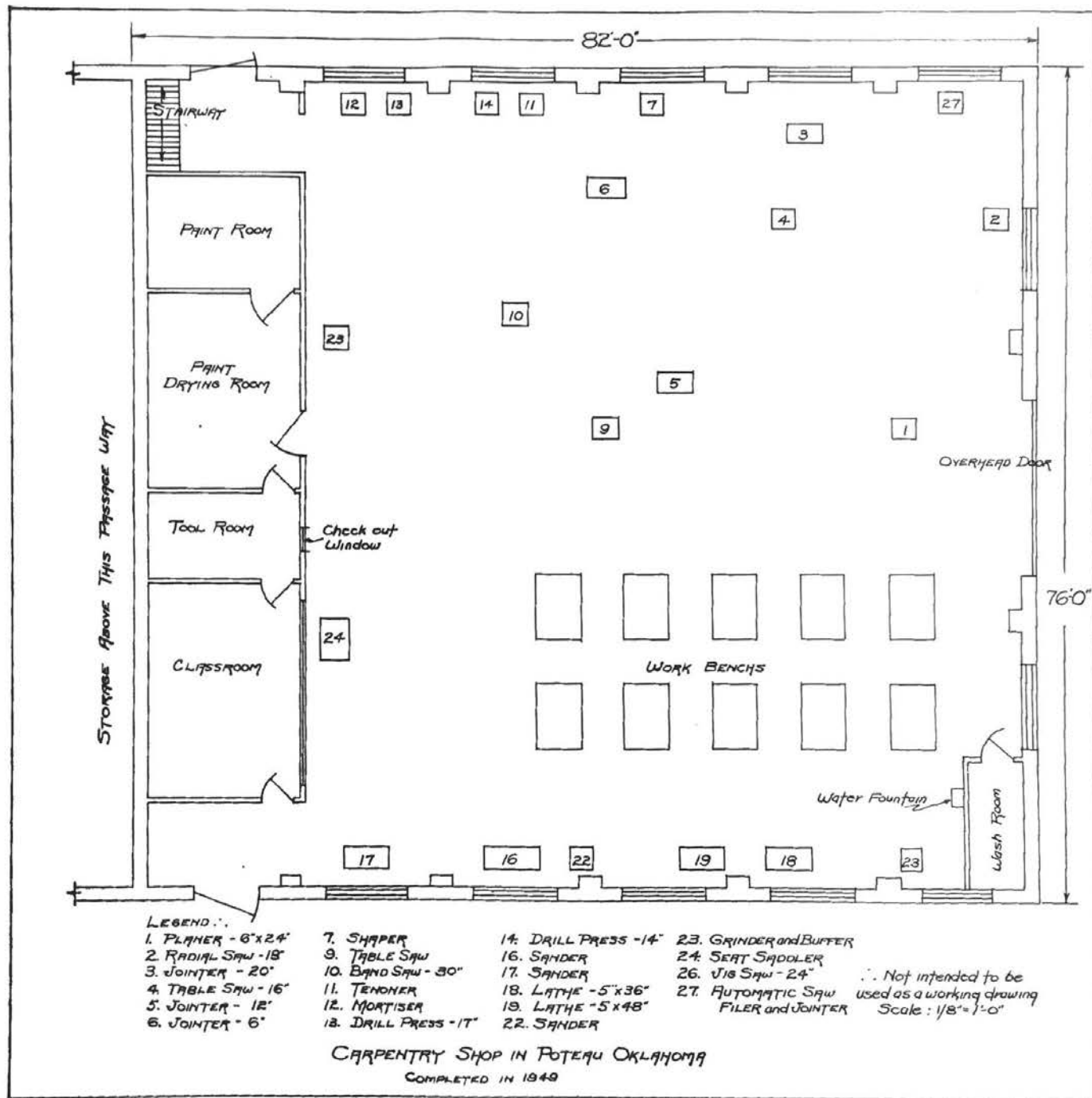


TABLE IV
ANALYSIS OF THE VOCATIONAL TEACHERS'
SUGGESTIONS ON EQUIPMENT NEEDED FOR CARPENTRY

Power Equipment Suggested	Minimum size Equipment suggested	Maximum size Equipment suggested	Quantity of Equipment suggested	Average size Suggested	Number of vocational Teachers replying	Teachers suggested Equipment not needed	Teachers suggested Equipment needed
Variety saw	10"	16"	1	12"	17	0	17
Band saw	16"	30"	1	24"	17	0	17
Jointer	6"	12"	1 & 2	8"	17	0	17
Grinder	Bench 1" x 6"	Oil stone 2" x 8"	1	Pedestal 1½" x 8"	17	0	17
Mortiser	Attach- ments on drill press	Auto- matic	1	Foot operated mortiser	17	6	17
Shaper	Attach- ments	¾" spindle 10,000 rpm	1	¾" spindle 8,000 rpm	17	2	17
Lathe	10" x 24"	16" x 48"	1 & 2	12" x 36"	17	5	12
Belt sander	6" x 6"	10" x 12"	1	8" x 8"	17	5	12
Portable sander	3" belt	4½"	1	3½"	17	6	11
Skill saw	7"	8"	1	7½"	17	9	8
Spray paint equipment	3 cu. ft. per min.	10 cu. ft. per min.	1	6 cu. ft. per min.	17	2	15
Tenoner	No	size suggested	1		17	13	4
Electric drill motor	1/4"	½"	1 to 2	1/4" & ½"	17	3	14
Radial saw	7"	14"	1	10"	17	3	14
Drill press	14"	21"	1	17"	17	5	12
Surfacer	12"	42"	1	24"	17	0	17

POWER EQUIPMENT LIST FOR CARPENTRY SHOPS

ITEM	QUANTITY	DESCRIPTION
1.	1	VARIETY SAW Tilting table or tilting arbor saw. The arbor is to be fitted for a dado head and the table should be slotted accordingly. Saw size should range from 12 to 16 inches in diameter. The motor should range from 2 h.p. to 5 h. p.
2.	1	BAND SAW 16 to 30 inch band saw with upper and lower wheels to be completely guarded. Table to tilt to 45 degrees. Motor to be 1 h.p. to 3 h. p.
3.	1	JOINTER 8 to 12 inch jointer. Direct motor drive, ball bearing. Cylinder to be of safety-head type. Table to be fitted for rabbeting. Jointer to be equipped with safety guard.
4.	1	GRINDER Pedestal grinder with motor-in-head. Wheels are to be equipped with safety flanges and carefully guarded. Wheel size should be 10 x 1 1/4 inches or large. Minimum motor 1/2 h.p.
5.	1	DRILL PRESS 15 inch floor model or larger.
6.	1	SURFACER 18-20-24 or 30 inch single surface planer. Safety-head cylinder, three-knife type, fitted with good grade steel knives. 2 to 7 1/2 h.p. motor.
7.	1	MORTISER Hollow chisel mortiser, foot feed. Table to be of the tilting type with hold-down clamps and stop rods. Direct motor driver preferred.

ITEM	QUANTITY	DESCRIPTION
8.	1	SHAPER 8000 to 12,000 rpm Spindle Shaper. Motor to be from 1 to 3 h.p. Approximate table size 22 x 42 inches.
9.	1	LATHE 12 to 16 inch motor-in-head, variable speed lathe. 36 to 48 inches between centers. Complete with face plate and lathe tools. Floor model.
10.	1	PORTABLE SANDER
11.	1	PORTABLE POWER SAW Saw complete with blades.
12.	1	SPRAY PAINT EQUIPMENT Two stage air compressors, Motor 1 to 3 h.p. complete with spray gun and regulators.
13.	1	ELECTRIC DRILL MOTOR 1/4 to 1/2 inch drill motor with jacobs chuck.
14.	1	RADIAL SAW 12 inch radial saw, complete with blades, 2 h.p. to 3 h. p. motor, and floor stand.
15.	1	SAW FILER Saw filer for hand, band, and circular saws.

OTHER EQUIPMENT FOR CARPENTRY SHOPS

ITEM	QUANTITY	DESCRIPTION
1.	1	BLACKBOARD Approximate size 4 x 12 feet
2.	1	BULLETIN BOARD Approximate size 4 x 4 feet
3.	1	BOOKCASE For reference books, catalogs, etc. A shelf cabinet with glass doors.
4.	1	FILING CABINET Metal 4-drawer for class records, instruction sheets, drawings, etc.
5.	1	TEACHER'S DESK Standard class room desk
6.	1	FIRST AID CABINET AND SUPPLIES
7.	6	WORK BENCHES Standard double work benches with rapid acting vises.
8.	4	FIRE EXTINGUISHERS

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
BEVELS	
Protractor	2
Sliding T, 8".....	4
BITS	
Auger, 3/16" to 1" inclusive by 16ths, each.....	3 sets
Auger 3/16" to 1/2" inclusive by 16ths, each	3 sets
Braces, ratchet type, 8", 10", 12", or 14" sweep.....	6
Countersink, for wood, rose pattern 1/2" and 5/8", each....	6
Dowel, square shank, 1/4", 5/16", 3/8", 1/2", 3/4" each...	3
Expansive, 7/8" to 1 1/2"	1
Expansive, 7/8" to 3"	1
Forstner, square shank, 1/4 to 1/2" inclusive, by 16ths, each	1
Screw Driver, square shank, 1/4", 5/16", 3/8" each.....	6
Twist drill for wood, square shank 1/16" to 3/8"	
inclusive, by 16ths, each	3
Twist drill, straight shank, 1/16" to 3/8", inclusive	
by 32nds, each.....	3
BLOW TORCH	1
BROOMS	1
BRUSHES	
Bench Duster, 10".....	12
Glue, round 1/2" and 3/4" each	2
Glue, round 1 1/2"	2
Marking camel's hair, No. 1 and No. 2, each	1
Varnish, flowing, 2"	2
Varnish, flowing 2 1/2"	1
Varnish, flat, 1/2"	1
Varnish, flat, 3/4"	1
Varnish, flat, 1".....	1
Burnishers, oval or round	2
CALIPERS	
6" outside	2
6" inside	2
12" outside	2
12" inside	2

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
CAN OPENER	1
CHISELS	
Cold, machinists', 3/8" and 1/2", each	2
Mortising chisel and bits, 1/4", 3/8", 1/2" and 5/8", each ..	2
Socket-firmer, bevel edge, 1", 1 1/8" and 1 1/4", each ..	1
Socket-firmer, bevel edge, 1/4", 3/8", 1/2", 5/8", 3/4" .. and 7/8", each	2
Socket-firmer, plain edge, 1/2", 3/4", and 1", each	1
Tanged-firmer, bevel edge, 1/8", 1/4", 1/8", 1/2", 3/4", 1" and 1 1/4", each	2
CLAMPS	
Screw, adjustable, 24", 36" and 48", each	8
Screw, adjustable, 60"	8
DIVIDERS	
Wing 6" and 10", each	2
DOWELING JIGS	
With bushings	2
DRILL	
Automatic hand, with 8 drill points, chuck, 0 to 3/8"	2
Hand, 0 to 3/8" for round shank drill	2
Star, for concrete, 1/2" and 3/4" each	1
FILES	
Auger bit, assorted 6"	1
Cabinet, 8" and 10", each	1
Card and brush	4
Flat, wood 10"	4
Mill, bastard cut 10"	4
Round, bastard cut 12"	2
Taper, slim, 5 1/2" and 7", each	6
FLOOR BRUSHES	
24"	4

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
GAUGES	
Bit, adjustable	2
Marking, metal or hardwood	6
GLASS CUTTER	1
GOUGES	
Tanged firmer, outside ground, handled, 1/8", 1/4", 1/2", 3/4", 1", each.....	1
Tanged firmer, inside ground, handled, 1/8", 1/4", 1/2", 3/4", 1", each	1
PUTTY KNIVES	2
RASPS	
Half-round, wood, 10"	6
RULES	
Folding rule	12
1' or 2' graduated by 8ths and 16ths	12
Shrink, 1/8", 3/16", each	1
SAWS	
Back, 12", 14 point	6
GOUGES	
Spoon, 1/2", 3/4", and 1" each	1
HAMMERS	
Ball peen, 12 oz. and 8 oz. each	1
Claw, bell-faced, 10 oz.	4
Claw, bell-faced, 12 oz.	4
Claw, bell-faced, 13 oz.	4
Tack hammer	1
HAND SCREWS	
Adjustable, length of jaws, 4", 5" and 6" each.....	2
Adjustable, length of jaws, 7" and 8", each	2
Adjustable, length of jaws, 10", 12", and 14" each	2
Hatchet, bench 4" cut	1

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
JARS, EARTHENWARE	
1 quart capacity	4
LEVELS	
Wood, 24", 36", 48" each	1
MALLETS	
Hickory, 3" by 5" head	6
NAIL SETS	
Point, 1/16" and 3/32", each	2
OILERS	
Bench, 1/3 pint, coppered, best grade	3
OILSTONES	
1" x 2" x 8"	1
Gouge slip, medium, 4 1/2" x 2, 1/8" x 5/16"	1
Gouge slip, fins, 3" x 2" x 3/8" x 1/8"	1
PINCHERS	
6" carpenters'	4
PLANES	
Block, adjustable, 6" long, 1 5/8" cutter	2
Circular	1
Combination, adjustable	1
Fore, 18"	1
Jack, 14"	12
JOINTER	
24"	1
Router	1
Smooth, 9", 1 3/4"	4
PLIERS	
Round nose, 5"	2
Side-cutting, 6"	2

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
BENCH DOGS, 3/4", 1" and 1 1/4" each	24
SAWS	
Band, 1/4", 3/4" to fit power machine, each	2
Compass, 10"	2
Coping, frames	6
Coping, blades	2 doz.
Crosscut, 8 and 10 tooth, 24" long, each	3
Crosscut, circular for power machine	2
Dado, 1/8" to 1 1/16" to fit power-saw arbor	1
Hack, frames, 8" or adjustable	2
Hack, blades, 8"	1 doz.
Keyhole, 10", 10 point	1
Rip, 7 point, 22" long	2
Rip, circular for power machine	2
Turning frames, 14"	1
Turning blades, 3/16" x 12", 10 teeth	2
Miter-box, 24" x 4", saw 7" capacity at miter	1
SCRAPERS	
Cabinet	4
Glue, triangular	2
Veneer, blade 2 3/4" long, handle 11" long	2
SCREW DRIVERS	
Cabinetmakers', 4", 6", and 8" each	3
Quick-return, spiral ratchet	1
SNIPS	
Tinners' forged steel, 2 1/2" cut	1
SPOKESHAVES	
Adjustable, raised handle, 10" long	4
SQUARES	
Combination, 12"	4
Try-iron handle 8"	12
Framing, 2'	6

SMALL TOOLS FOR CARPENTRY SHOPS

DESCRIPTION	QUANTITY
STEEL FIGURES	
Hand cut, 1/8", sets	1
TAPELINE	
50' steel	1
TRAMMEL POINTS	
Adjustable metal frame, steel points	1
PLUMB BOB	1
GLUE POT	
1 quart electric.....	1
NAIL SETS	
Assorted.....	1 set
GOGGLES	1 pr.
TURNING TOOLS	
Parting tools, 1/8"	1
Round point, 1/4", 1/2", each	1
Spears point, 1/4", 1/2", each	1
Square point, 1/4", 1/2" each	1
Turning chisels, 1/4", 1/2", 3/4" each	1
Turning gouges, 1/4", 1/2", 3/4" each	1
Turning skews, left-hand, 1/2", 3/4" each	1
Turning skews, right-hand, 1/2", 1/4" each	1
WISE	
3" jaw, anvil face.....	1
WRENCHES	
Adjustable 8", 10" and 12" each	1
Pipe, 10" and 12" each	1
Open-end type to fit 1/8" to 1" U.S.S., nuts, each	1

CHAPTER V

GENERAL SUGGESTIONS FOR NEW PROGRAMS

Since conditions in each local community vary, it is impossible to put into writing suggestions that would always be applicable. The amount of funds available, building space, number to be trained and many other conditions will be controlling factors in each individual school. However, it is hoped that the suggestions on the following pages will be helpful to both the school authorities and the architect in planning a new vocational shop.

Suggestions regarding shops other than carpentry are included in this chapter because planning should be done on the basis of a total vocational program rather than for an individual shop.

The following suggestions are made after considerable research and study. The writer wishes to acknowledge the use of the research studies of the Bureau of Trade and Industrial Education in California.

THE SHOP BUILDING

School shops should be housed in one or more shop buildings or shop wings planned as integral parts of the total educational plant. Shop buildings or shop wings ideally should be one story in height.

A trade school building site should be large enough to provide for future expansion, centrally located, near good public transportation

facilities, near (or include) car parking space, and should be located in a neighborhood that is an enhancing influence in the attraction of qualified students and the esteem of industry, parents, and the public.

Vocational shops should be grouped according to their relation to each other, such as: building trades, needle trades, food trades, metal trades, automotive trades, graphic arts, service occupations, etc.

Noisy school shops such as auto body and fender and diesel engines should be located so that they do not disturb other school activities. This does not mean isolation.

Shops should be located so that they are accessible for adult evening use.

Vocational shops depending on customers for instructional projects, (cosmetology, cleaning and pressing, cooking, auto mechanics, radio service) should be located so that they are easily accessible to customers.

Auto shops and other shops requiring automobile or truck access should have entrance and exit to driveways.

Heavy equipment shops should be located on the ground floor. In a multiple story shop building the floor location of shops should take into consideration floor equipment load, service requirements, accessibility to customer public, natural lighting requirements, and elevator service requirements. School shops should not be located in basement areas.

Shops should be acoustically treated for auditory comfort. Acoustical material used should be capable of being stained and restained without losing its acoustical properties.

Shops should be located away from playing areas.

Shop ceiling height should not be less than 12 feet, preferably 14 feet.

School shops which create fumes (auto, diesel engines, painting) should be placed, if possible, so that the prevailing winds will carry the fumes away from other school buildings and private property adjacent to the school

FLEXIBILITY AND EXPANSIBILITY

Partitions between shops should be nonbearing curtain walls as free as possible from mechanical and utility installations.

Fenestration pattern should be continuous along entire wall rather than grouped especially for each shop.

Heating and lighting services should be engineered so that controls serve relatively small areas within shops.

Conduit and other utility supply services should be based on a liberal rather than restricted estimate of future needs.

Cabinets, lockers, shelves, and work benches should be based on a liberal rather than restricted estimate of future needs.

Cabinets, lockers, shelves, and work benches should be standardized as far as possible. Shelving in cabinets, lockers, and other shelf areas should be of the adjustable type except where safety requires rigid shelving.

Corridors should be carried through to outside walls wherever

extensions are possible. Stairs should be placed in separate enclosures off the corridor rather than in corridor ends.

Ample site area should be left undeveloped where building additions are logical.

Partitions between shops should be so constructed that they can be removed to convert two shops into one, three shops into two, or other space arrangements as conditions in later years warrant.

SIZE AND DIMENSIONS OF SHOPS

Vocational trade and industrial shops will vary in size according to the activity to be housed, but the following space allotments are recommended as a guide in establishing space requirements for the open shop area. The allotments are based on a minimum class load of 20 students.

A. "Heavy" shops--auto, machine, cabinet, electric, sheet metal, body and fender, welding, carpentry, cooking and baking, graphic arts.

<u>Shops</u>	<u>Sq. ft. per pupil</u>	<u>Sq. ft. total open shop area</u>
Minimum	100	2,000
Adequate	150	3,000
Desirable	200	4,000

B. "Light" shops--drafting, power sewing, radio, industrial science laboratory.

<u>Shops</u>	<u>Sq. ft. per pupil</u>	<u>Sq. ft. total open shop area</u>
Minimum	50	1,000
Adequate	75	1,500
Desirable	100	2,000

Aviation and cosmetology are not included in the foregoing table. Aviation shops should meet the CAA requirements; cosmetology shops should meet the standards of the State Board of Cosmetology.

The open shop area should be rectangular in shape. The width to length ratio should be from $1:1\frac{1}{2}$ to $1:2$.

THE OPEN SHOP AREA--EQUIPMENT AND LAYOUT

The instructor should be able to look over the entire open shop area from any point in it.

The shop instructor should have headquarters in the open shop area, or office with clear glass windows, equipped with one or two desks, chairs, and files, so placed that they command a full view of the entire shop.

Arrangement of equipment should be determined by consideration of safety, instructional efficiency, and industrial practice in the order named.

The size and shape of the open shop area should be determined in large part by the equipment arrangement plan.

Equipment and work stations should be so placed that there is no danger of interference with adjacent workers.

Equipment and work stations should be placed, where possible, so that related activities are in close proximity.

Distinct aisles of travel should be provided for free flow of student traffic between all areas and points of common usage such as

storage rooms, tool rooms, and common machine areas. Aisles of travel should be not less than 3 feet in width, preferably 4 feet.

Spacing between benches, machinery, equipment and aisles should be sufficient for safety and free passage. This is determined by the nature of the shop work and the equipment involved, but should be not less than 3 feet, preferably 4 feet.

Machines around which danger zones exist should be adequately guarded and lines painted in red or in contrasting color on the floor around the machines to indicate danger zones.

All shops should have at least two exit doors, one of which should be larger than the largest piece of equipment or instructional project to be moved in or out of the shop.

Open spaces should be provided near entrances and exits to eliminate congestion.

A clear floor space (4' to 6') should be provided in front of the tool room issue counter.

An open assembly area should be set aside in shops requiring space for assembly of projects.

The auto shop should have an off-the-street area outside the shop, surfaced and preferably enclosed.

If lumber, bar steel, and other materials are to be stored in the open shop area, special racks and shelving should be provided.

Equipment, except for the portable type, should be fastened securely to the floor, heavy bench, or other stable foundation.

Heavy equipment should be mounted on concrete bases projecting to the floor level and insulated from the floor slab and other structural members of the building.

Machines that create a vibration problem should be cushioned with rubber mountings or other shock absorbing material.

Bases of cabinets, benches, and machines should provide toe space for the comfort of the student workers.

Machinery should not be mounted on columns or against pipes if these will transmit noise to other parts of the building.

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

Operation level of equipment should be set at the average elbow height of the students.

The start-stop switch box should be located within easy reach of the operator.

Built-in work benches 28 inches wide with heavy wooden tops at least $1\frac{1}{2}$ inches thick, covered with 10 gauge steel plate should be provided along most of outer walls in the automobile, machine, and metal shops. The space underneath these benches should be enclosed with locked steel doors with storage for parts, projects, etc. Electric shop benches should be similar but not covered with steel plate.

Machines which are used primarily in roughing out stock should be placed near the stock room.

Lockers for the storage of students' personal belongings should be

provided in all school shops. Separate, additional lockers should be provided for adult evening classes. Lockers should be placed on 6 inch foundation.

The locker area should provide space for changing clothing, where this is necessary, and the area should be so located that it can be readily supervised by the instructor.

Lighted exhibit and display cases should be provided both in the shop itself and in central locations in the principal part of the school plant.

Power and light controls should be centralized on a locked master control panel, with pilot light, and located if possible, near the instructor's desk or office.

Shops using portable power tools should be provided with one double electric wall outlet every ten feet of wall space.

A washing station should be provided for each five students in shops such as wood, metal, printing, and auto.

Hot water should be available in all shops.

Every shop should have a drinking fountain, located in a place where it will not cause congestion, but in view of the instructor.

Provision should be made for one or more general bulletin boards placed in a strategic position such as the entrance to the shop or tool room.

Fire extinguishers must be part of the shop service equipment, located conveniently near points of danger and marked or labeled

conspicuously.

Provision should be made for location of the shop first aid kit in the instructor's area or office.

A space should be set aside in each shop for the waste and refuse container. In shops that accumulate considerable waste and refuse the container should be mounted on rollers to facilitate collection.

Gas welding tank storage should be located outside of the welding shop, preferably close to driveway.

Storage units should be kept below the working level in printing shops.

AUXILIARY ROOMS AND FACILITIES

The number and kind of auxiliary rooms and areas depend upon the type of shop, but all shops require auxiliary rooms and areas of one kind or another which should be planned along with the rest of the shop (tool room, supply room, storage room, shop class room or instructional area, shop office, finishing room, toilet room.)

Every shop, or group of related shops should have its own supply-storage room, the size determined by the nature of the shop work, the number of students to be provided for, and the type and quantity of supplies to be stored.

The location of the supply room should consider ease in unloading from delivery trucks and storing of supplies as well as convenience in issuing supplies to students.

The lumber supply room or other supply room storing heavy or bulky material should be located if possible so that delivery trucks can unload directly into it. For these rooms the doors in the opposite end should open directly into the open shop area.

With few exceptions each vocational shop, or group of related vocational shops, should have its own tool room.

Separate supply storage and project storage facilities should be provided in shops which are to be used extensively by adult evening classes.

Both the supply room and the tool room should be located so that students can reach them and return to their work stations by having to pass as few other students and machines as possible. This usually means placing these rooms in the center of the long side of the shop.

Racks, shelving, drawers, cupboards and cabinets, designed for items to be stored, should be provided in the supply-storage room and tool room.

The tool room should be designed so that the instructor can easily observe what the tool keeper is doing without having to enter the tool room itself.

A small shop class room is a highly desirable adjunct to most shops for planning, drafting, and related studies. An instructional space in the open shop area or a nearby standard class room may be used instead of a shop class room.

A shop class room of 480 square feet (20' x 24') is large enough for most shops. For an instruction space in the open shop area 12' x 18' should suffice.

The shop class room should be equipped with a teacher's desk demonstration table or bench, six large tables with 24 straight back chairs, ten to twenty feet of blackboard, twenty feet of pinning board, library shelving for housing the shop reference library, cabinets for storage of blueprints, catalogs, and other reference material, and one electric wall outlet on each wall. The room should be acoustically treated.

If instruction space in the open shop area is used instead of a class room, it should be provided with a teacher's desk, demonstration table or bench, portable blackboard, twenty-four tablet arm chairs, and cabinets for storage of instructional materials.

Separate lock-up space should be provided for use of evening school instructors.

Toilet facilities should be provided for in the shop area unless the overall building plan provides general toilet facilities. Shop location is preferred.

Compressed air should be provided by a central air compressor unit with outlets in the shops that require compressed air. A stand-by auxiliary unit should be provided if there is considerable pneumatic equipment in the shops.

The shop air compressor unit should be located so that noise from its operation will not disturb classes. It should not be located in an open shop area.

A separate dust proof finishing room equipped with an independent exhaust system is recommended for carpentry, cabinet shops, and other

shops where project finishing is done.

Shop class rooms or other class rooms should be equipped for showing pictures, including electrical outlets and controls, and "built-in" screen.

Electrical outlets and controls should provide for a minimum of teacher movement, with outlet and controls for room lights and projector at one point.

A special cabinet on wheels is recommended for moving projection equipment from one room to another.

VISUAL COMFORT AND EFFICIENCY

Full advantage should be taken of the possibilities for natural lighting through maximum window area, bilateral lighting, and overhead lighting. North and east light should be secured whenever possible.

Natural light should be supplemented by artificial light to the extent that the artificial light alone will provide illumination that conforms to adopted standards.

Artificial lighting systems should produce a uniform distribution of shadow free and glare-free illumination.

General artificial lighting should be by indirect or semi-indirect fixtures--incandescent or fluorescent.

Artificial lighting for shops in general should produce thirty to forty foot candles on the work. Lighting for mechanical drawing and other shops where precision work is carried on should produce fifty foot candles or more on the work.

General lighting should be supplemented with additional local lighting on all machines and in areas where precision work is done.

Ceilings should be painted an off-white with light colored walls, trim and built-in equipment.

Furniture and other shop equipment should be finished in light rather than dark colors.

Machinery and equipment should be painted in colors that will minimize eye fatigue and promote safety.

The nonoperating machine body should be finished in receding shades (gray, green) to create a visual working area that minimizes eye fatigue.

Operating machine parts should be finished in colors that are in strong contrast to the nonoperating machine body to separate the critical from the noncritical and to visually divorce the critical machine parts from the material being worked upon.

High visibility colors should be used on control levers and switch boxes, with black for starting button and red for stopping button.

VENTILATION AND HEATING

The heating and ventilating system should maintain comfortable and healthful conditions at all times.

The ventilating system should provide fresh outdoor air constantly, keeping it gently in motion.

Dust, smoke, odors, fumes, vapors, and gases should be exhausted by mechanical means.

Gas and diesel engine exhausts should be muffled and connected to

exhaust pipes that discharge outside of the building.

Mechanical ventilation should be provided for the following shops and areas: Wood, welding, auto mechanics, body and fender, painting, cooking and baking, aircraft engines, refrigeration, photography, foundry, and furnaces.

The heating system should maintain automatically a temperature of 68° measured sixty inches above the floor for shops, 70° measured thirty inches above the floor for class rooms.

The temperature variation from floor to sixty inches above the floor should not exceed 5°, preferably 3°.

FLOORING

Flooring selected should have a wearing surface designed to endure but not so nonresilient as to be detrimental to health. It should be insulated to reduce noise in the shop and prevent transmission of noise to other shops and class rooms.

Flooring should present a pleasing appearance, be easily cleaned, require a minimum of repairs, and be finished to reduce the danger of slipping.

Flooring materials will differ from shop to shop and within a particular shop to meet the needs of the activity to be accommodated. The following common flooring materials rated "S" are considered satisfactory for the shops and areas indicated. Those rated "1" are considered "first choice."

Shop	Maple	Vertical grained Douglas fir	End grained Wood block	Concrete	Linoleum	Asphalt Tile
Cabinet, carpentry	1	S	S			
Sheet metal	S	S	S	1		
Electric, Radio	1	S			S	S
Graphic Arts, printing	1	S			S	S
Drafting	1	S			S	S
Auto Mechanics body and fender				1		
Aviation				1		
Machine shop			S	1		S
Power sewing	1	S			S	S
Cosmetology	S	S			1	S
Welding				1		
Cooking and baking	S	S			1	
Foundry				1*		
General class rooms, offices	1				S	S

*Unfinished concrete or dirt

TEN STEPS IN PLANNING A SCHOOL SHOP

The first step in planning a school shop is to describe in some detail the educational activities to take place in the shop. The instructor, the supervisor, the administrator, the advisory committee and the group of participants concerned with the educational program should participate in the planning.

The second step is to determine the shop load, the number of students to be accommodated, the time available for instruction, the age and grade levels of the students, and the size and number of classes.

The third step is to become acquainted with current codes and standards for the construction of school shops and from this study to develop a reference check list applicable to the shop being planned.

The fourth step is to hold a preliminary conference with the architect, discussing educational activities, shop load, standards, building design, space considerations, and cost limitations for guidance in further planning. Visits, with the architect, to well planned schools and industrial shops are recommended.

The fifth step is to make a list of the equipment, tools, and supplies to be used in the shop.

The sixth step is to decide what principal areas, facilities, and auxiliary rooms are needed.

The seventh step is to draw, in consultation with the architect, a preliminary shop floor layout to scale, showing location of principal areas, facilities, auxiliary rooms, and equipment.

The eighth step is to prepare, for the architect, a description of the shop and a set of "instructor specifications" to explain and supplement the floor plan.

The ninth step is to assist the architect in the revision of the preliminary plan and to answer additional planning problems posed by the architect. Detail sketches of built-in equipment should be provided at this time.

The tenth step will be to assist the architect by providing answers to questions of detail as they appear during final planning and construction.

STEPS FOR ESTABLISHING A CARPENTRY PROGRAM

The writer wishes to offer the following suggestions based on the information obtained while visiting the carpentry programs in Oklahoma.

- A. Consult with builders, contractors, carpenters, lumber yard managers, real estate dealers and determine the need for carpenters in the community. (Do not plan to train carpenters based on needs in some other locality. The county is generally considered a good boundary line.)
- B. Survey the sophomore and junior classes and determine how many students are available for the course.
- C. Determine whether you can provide adequate housing for the shop in the present school buildings.
- D. Determine how much equipment the school already has. Can your school board buy the additional equipment.

- E. Determine the possibilities for a continued building program. Will it be possible for the class to have a training project each year?
- F. Establish a plan to finance the training project.

Note:

1. The project should meet the minimum requirements for an F. H. A. loan.
2. In no case should the carpentry class build a house or building for some individual person.

Possible finance plan:

1. The local school board may have the necessary fund to finance the entire project. Generally the local school board must manage at least to finance the lot on which the project is to be built.
 2. Sometimes local business establishments such as: the lumber yards, plumbing shops and electrical shops will sell the materials on credit terms and wait until the project is completed and sold for their money.
 3. A group of contractors, chamber of commerce, or a civic club could sponsor the project.
- G. Call on the State Supervisor of Trade and Industrial Education and discuss the possibilities for the program to succeed.
 - H. Have the State Supervisor check his budget to see if reimbursement money is available for part of the teacher's salary.
 - I. Have the State Supervisor check the prospective teacher to see if he can qualify to teach carpentry under the provisions of the

Oklahoma State Plans for Vocational Education.

A FIVE YEAR EQUIPMENT PLAN

One of the greatest problems of vocational education is "how to get enough full size up-to-date production type equipment to do a real job of training." In most communities evening adult classes can be offered if a real industrial type shop is available. Furthermore, it is believed that standard production type equipment will last longer and is cheaper in the long run. Therefore, it is recommended that only standard production type and size be purchased.

When sufficient funds are not available to purchase all of the equipment for a shop the first year, it is suggested that the five year purchase plan be used as follows:

First year:

- a. Band saw
- b. Variety saw
- c. Jointer
- d. Drill press with mortising attachments
- e. Grinder
- f. Hand tools

Second year:

- a. Surfacer
- b. Radial saw

Third year:

- a. Mortiser
- b. Portable sander

Fourth year:

- a. Shaper
- b. Spray paint equipment

Fifth year:

- a. Saw filer
- b. Electric drill motor
- c. Portable power saw

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This study has revealed a definite need for a series of bulletins describing the standards and procedures for the operation of each individual type of trade and industrial program. Although the Oklahoma State Plans for Vocational Education and the Federal policy bulletin, Administration of Vocational Education, are the sources of authority on all vocational programs, they do not include all of the detail information needed by school administrators to establish and operate a trade and industrial program of the highest possible standards.

Also, it was revealed that it is not always possible for a state supervisor and his staff to provide the supervision and help needed by new programs at the beginning of the school year. Furthermore, it would be impossible for any school administrator to remember all of the suggestions offered by a supervisor. Details such as course outlines, equipment lists, and floor plans must be provided in writing.

Letters received from twenty state supervisors in other states indicate that similar bulletins were either in process of being prepared or consideration was being given to the idea.

This study also revealed that the State Supervisor and his staff receive numerous requests from superintendents for information regarding the standards and policies.

It is proposed that chapters two, three, four, and five of this study be multigraphed and distributed as Standards Bulletin No. 1 entitled The Vocational Carpentry Program in Oklahoma.

The writer suggests that this bulletin should serve as a guide when establishing new carpentry programs. Also, it should prove helpful to teachers, supervisors and administrators in evaluating and improving programs now in operation.

The writer further recommends that similar studies be made relative to all other trade and industrial programs and that a bulletin be prepared setting forth the policies and procedures for operating each individual type of program.

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