

11.611

Annual State Conference
For Vocational Teachers
North Carolina State College.
Raleigh, N. C.

1925

Notes on Lecture or Discussion Work On
Farm Shop Work,
Given By.
F. T. Struck.
Director, Bureau of Vocational Education,
State Dept. of Public Instruction,
Harrisburg, Pa.

Tuesday July-14

9 to 10 A. M.

- I- The influence of the manual training movement in the U. S. upon ideals and practices in farm shop work.
- 1- The formalizing influence of traditional manual training.
- 2- The exercise method versus the project method.- the latter to be preferred.
- 3- The industrial arts movement- Its origin, aims, and place.- Prevocational education. Try-out experiences, Explorative opportunities, Appreciative understand of tools, materials, processes, design, and of the lives of the people engaged in the practical arts.

II- Purposes of Farm Shop Work.

- 1- Specific knowledge.
- 2- Vocational Skills.
- 3- Appreciation.
 - a. Evaluation or utilizing appreciation.
 - b. Cultural.
- 4- Attitudes.
 - a. Toward others- co-operation, respect for others rights, property rights honesty and application taught in connection with shop work.
 - b. The development of initiative and the power to think constructively.

III- Using the manual work as a vehicle for imparting much valuable information of a practical as well as of a cultural nature, and of a general as well as vocational kind.

IV- Some problems in financing farm shop work.

- 1- Raise funds by community affairs such as entertainments, suppers, etc.

- 2- Have pupils pay for material they use.
- 3- Have pupils make objects for school, or for others who will furnish the material.
- 4- Sell products in the neighborhood

V- Shop lay-out and equipment.

1. The separate shop building built with the aid of pupils.
2. Adapting the building for use of adults- evening and slack-season instruction.
3. Advantages of tool room, advantages of tool boards or racks.
- 4- Wide doors, and adequate light.
- 5- Washing facilities.
- 6- Equipment listed so that certain of it must be secured the first year, additional equipment the second year, and more the third year.
- 7- Advantage of careful specification in ordering tools and equipment.

I- Kinds of work that should be undertaken .

- a. Not that of carpenters, cabinet makers plumbers.
- b. That which is done by successful farmers of the community .
- c. Find out what this work is in your community.
- d. Relationship to farm enterprises and Technical agriculture being studied.

II- Planning the curriculum.

- a. 7th grades, try-out work 6 weeks each of 4 activities, 120 minutes per week of industrial work- appreciative study of tools, materials, processes design etc. of industrial arts.
- b. 8th. 180 minutes per week of specific vocational farm shop work.
- c. 9th- 180 minutes farm shop work.
- d. 10th- 180 minutes farm shop work.
- e. 11th- 180 minutes farm mechanics.
- f. Home projects in construction and repair work for the farm.
- g. Part-time and evening classes for adults.

III- The selection of shop projects.

- a. Should sketches or drawings be made before shop projects are undertaken?
- b. Logical versus psychological arrangement.
Interest and learning difficulties.
- c. Modifications due to other considerations.
- d. Should wood-work only be taught during the 9th grade or 1st year of the agricultural course? If not why not?
- e. How much rope work, leather work, and general metal work should be taught? How much instruction should be given in concrete work?

Tentative suggestion:

Wood---- 60%

General Metal work-20%

Concrete-----10%

Rope----- .05

Leather----- .05

On the basis of 100 hours per year (3 hours ~~for~~ 33 weeks)
this would mean 60 hours wood work, 20 of metal work, 10
of concrete, 5 of rope work and 5 of leather work per year
for three years.

f. Selecting in terms of corelated subjects.

a. Dove-tail with technical agriculture.

g. Size of farm shop projects.

a. Small at the start-larger as ability develops.

Iv- Use of job sheet.

Definition:

A Job sheet or lesson planstates a problem, indicates or suggests a method of approach to be used in solving it, and includes an evaluation of the results obtained. It may give information about tools, processes, design and finish, and it should provide for increased initiative or resource fulness on the part of the learner.

b. Should job sheets be used?

c. How should they be developed?

Sketching and Mechanical Drawing.

(Read chapter XVII Construction and Repair work for the Farm,
Houghton Mifflin Co., 2 Part, St., Boston 8)

I- Aimes and objectives.

- 1- To read working sketches and blue prints .
- 2- To make working sketches (not to scale)
- 3- To make out bills of material and write simply accurate specifications.
- 4- To make working drawings to scale in pencil (work from full size to smaller scales.)
- 5- To make working drawings to scale in ink, and make tracings and blue prints. (This to be done only with the exceptional boy, or perhaps only once by each boy.)

II- What standard of technique is to be regained.?

Not to be held to same standard as students preparing for engineering or for drafting as a vocation.

III-Use of Cross-section paper.

Samples of paper ruled 8 lines to the inch, and bound in pads were distributed.

IV- How to make blue prints.

A demonstration was given showing how blue prints are made:

- 1- The tracing may be on either tracing cloth or on tracing paper.
- 2- The sensitized blue-print paper may be bought in rolls of 10 yards or more. It must be kept away from light except when being used with a tracing.
- 3- The tracing is placed against the glass in a frame, so that it reads properly when looking at it through the class.
- 4- The sensitized paper is placed right back of the tracing, chemical side next to the tracing.

- 5- It is exposed to sunlight for perhaps a minute and a half
(watch the color of the paper and try it out with small samples before attempting a large print)
Artificial light-electric is more satisfactory because of its uniform intensity.
- 6- Wash out the tracing by lightly splashing water over it, or by drawing it through water. This may take a minute or two -wash it until the soluable chemical is all washed out.
- 7- Clasify or intensify the colors by using a small amount of saturated solution of potassium chromate in the water bath.
- 8- Hang up the blue-print in the shade to dry.
- 9- Do not get water on tracing cloth. It will dissolve the size and cause white spots in blue prints.

V- Use standard (third angle) orthographic projection (see page 337)
This was illustrated on the blackboard.

Sketching and Mechanical Drawing (Continued)

I- Lettering:

- 1- Use only one style, such as single line Gothic- upper case and lower case.
- 2- Use either vertical or inclined lettering but preferably teach one or the other as the time is too limited to teach both well.
- 3- Use aids such as alphabet sheets that are sent out free of charge by some manufacturers of drafting supplies.
- 4- Take a little time to show the basic strokes used in lettering.

II- Isometric drawing.

- 1- Advantages of isometric sketches.
- 2- Use of isometric paper.

III-Standard sizes in paper.

- 1- Use sizes that are multiples of each other.
- 2- That can be handled and stored conveniently.

IV- Colored papers

A cream or buff colored paper will show soiling less than will white paper.

V- Protect prints if mounted with transparent shellac.

Paints, Varnishes, and Stains.

See pages 50- 56. "Construction and Repair work for the Farm".

I - What paint is.

- a. Pigment.
- b. Vehicle and thinner
- c. Dryer.

- d. Glosay paint.
- e. Flat paint.

II. What varnish is.

- a. Composed principally of resins or fossil gums, dissolved by heat in drying oils, then thinned with volatile thinners such as turpentine or mineral spirits.
- b. Shellac
- c. Japans.

III- What enamel is

- a. Combination of pigment and varnish.

IV- What stain is.

- a. Transparent or semi-transparent color pigment in water, oil, spirits or varnish.

V- What floor wax or furniture wax is

Essentially the same as a light shoe polish- one having a base of beeswax and parafine with a volatile substance such as turpentine.

Selection and Care of Brushes.

- 1- Never put paint brushes in water.
- 2- Suspend them in linseed oil, with about 2" of oil below the lowest end of the brush.
- 3- Hang them in an upright position by **boring** hole in base of handle, and passing a wire through **this** hole.
- 4- **Shellac** brushes should be cleaned in alcohol, or if none is available with hot water and soap.
- 5- Varnish brushes should be cleaned with gasoline, after hanging in oil, before using.

Saturday.

Illustrated lecture showing film "The manufacture and use of concrete"
followed by lantern slides on forestry, lumbering, and farm shop
work.

Addressess of a few dealers.

Note: This list is incomplete and merely suggestive. Other firms
may make equally satisfactory products.

I- Drafting supplies and equipment.

American Blue Print Paper Co. 445 Plymouth Court, Chicago, Ill.

Eugene Dietzgen Co. New York, Chicago, Wash.D. C. etc.,

Keuffel Esser Co., " " "

II- Woodworker's tools.

Henry Disston & Sons, Philadelphia, Tacony Pa, (saws, files etc)

E. C. Atkins & Sons, Indianapolis, Ind. " "

Simonds Saw Steel Co. Fitchburg, Mass. " "

Stanley Rule and Level Co. New Brittain, Conn.

Millers Falls Co. Millers Falls, Pa.

David Maydole & Co., Norwich, N. Y. (Hammers)

III- Stains, Enamels etc.

S. C. Johnson & Son. Racine Wisc.

Dupoint De Nemours Co., Wilmington, Del.

IV-Woodworking Machinery.

American Wood Working Machinery Co. Rochester, N. Y.

Oliver Machinery Co. Grand Rapids, Mich.

J. A. Fay and Egan 2750-2850 Robertson Ave., Cincinnati, Oakley,
Ohio.

Crescent Co. 46 Cherry St., Leetonia Ohio.

J. D. Wallace, Co., 134 S. California, Ave., Chicago, Ill.

V- Metal Lathes.

South Bend Lathe Works, Cincinnati, Ohio.

Monarch Machine Tool co., Sidney, Ohio.

VI- Machinists tools.

L. S. Starret Co., Athol, Mass.

VII- Rules.

Lufkin Rule Co., Saginaw, Mich.

VIII- Oil Stone Grinders (power)

Mummert- Dixon Co., Hanover, Pa.

IX- Vises, A. L. Bemis 72 Commercial St., Worcester, Mass.

Reed Mfg. Co. Eri, Pa.,

H. P. Martin & Sons, Owensboro Ky. (Portable pipe vises)

X. Stones.

Pike Mfg. Co., Pike, N. Hampshire,

Garborundum Co., Niagara Falls, N. Y.

11.611

OUTLINE OF FARM SHOP WORK

DEPARTMENT OF AGRICULTURAL ENGINEERING

N. C. State College of Agriculture and Engineering

D. S. Weaver

LECTURE WORK

One Hour per Week for One Term

A. METHODS

I - The influence of manual training movement in the U. S. upon ideals and practices in farm shop work.

1. The formalizing influence of traditional manual training.
2. The exercise method versus the project method - the latter to be preferred.
3. The industrial arts movement - its origin, aims and place. Prevocational education. Tryout experiences, explorative opportunities, appreciative understanding of tools, materials, processes, design, and of the lives of the people engaged in the practical arts.

II - Purposes of Farm Shop Work.

1. Specific knowledge.
2. Vocational skill.
3. Appreciation
 - (a) Evaluation or utilizing appreciation.
 - (b) Cultural.
4. Attitudes.
 - (a) Toward others - cooperation, respect for others rights, property rights, honesty and application taught in connection with shop work.
 - (b) The development of initiative and the power to think constructively.

III - Using the manual work as a vehicle for imparting much valuable information of a practical as well as of a cultural nature, and of a general as well as vocational kind.

IV - Some problems in financing farm shop work.

1. Raise funds by community affairs such as entertainments, suppers, etc.
2. Have pupils pay for material they use.
3. Have pupils make objects for school, or for others who will furnish the material.
4. Sell products in the neighborhood.

V - Shop lay-out and equipment.

1. The separate shop building built with the aid of pupils.
2. Adapting the building for use of adults - evenings and slack season instruction.
3. Advantages of tool room, advantages of tool boards or racks.
4. Wide doors and adequate light.
5. Washing facilities.
6. Equipment listed so that certain of it must be secured the first year, additional equipment the second year, and more the third year.
7. Advantage of careful specification in ordering tools and equipment.

VI - Kinds of work that should be undertaken.

1. Not that of carpenters, cabinet makers, plumbers.

2. That which is done by successful farmers of the community.
3. Find out what this work is in your community.
4. Relationship to farm enterprises and technical agriculture being studied.

VII - The selection of shop projects.

1. Should sketches or drawings be made before shop projects are undertaken.
2. Interest and learning difficulties.
3. Modifications due to other considerations.
4. Should wood-work only be taught during the 9th grade or 1st year of the agricultural course? If not why not?
5. How much rope work, leather work, and general metal work should be taught? How much instruction should be given in concrete work?

Tentative suggestion:

Wood -----	60%
General metal work -----	20%
Concrete -----	5%
Rope -----	5%
Leather -----	5%
Miscellaneous -----	5%

6. Selecting in terms of correlated subjects.
 - (a) dove-tail with technical agriculture.
7. Size of farm shop projects
 - (a) Small at the start - larger as ability develops.

VIII - Use of job sheet.

Definition.

1. Job sheet or lesson plan states a problem, indicates or suggests a method of approach to be used in solving

it, and includes an evaluation of the results obtained. It may give information about tools, processes, design and finish, and it should provide for increased initiative or resourcefulness on the part of the learner.

2. Should job sheets be used ?
3. How should they be developed ?

B. SUBJECT MATTER:

The remaining time in lecture work is devoted to discussions of such subject matter as can be best illustrated with the class as a whole, with no equipment except a blackboard. Many examples of this method can be given where the subject can be presented this way first, with better results than introducing it in the shop.

Example - Rafter Cutting:

I. Definition of terms.

- (a) Span
- (b) Rise
- (c) Run
- (d) Pitch
- (e) Nomenclature of parts involved as plate, ridge, stud, collar beam, rafter, etc.

2. Blackboard illustration of same.
3. Description of framing squares, its parts and use.
4. Laying out simple rafters, several methods.
5. Laying out simple hips, jacks, valleys, etc.
6. Checking use of square, by mathematics.

Other phases of shop work do not lend themselves to such treatment and no time in class room is given to them.

Combinations of lectures and demonstration help usually in class room, when equipment needed is simple as in -

SKETCHING AND DRAWING

I. Aimes and objectives:

1. To read working sketches and blue prints.
2. To make working sketches (not to scale)
3. To make out bills of material and write simply accurate specifications.
4. To make working drawings to scale in pencil (work from full size to smaller scales)
5. To make working drawings to scale in ink, and making tracings and blue prints. (This to be done only with the exceptional boy, or perhaps only once by each boy.)

II. What standard of Technique is to be regained ?

Not to be held to same standard as students preparing for engineering or for drafting as a vocation.

III. Use of Cross-section Paper.

Samples of paper ruled 8 lines to the inch, and bound in pads are distributed.

IV. How to Make Blue Prints.

A demonstration was given showing how blue prints are made:

- 1 - The tracing may be on either tracing cloth or on tracing paper.
- 2 - The sensitized blue-print paper may be bought in rolls of 10 yards or more. It must be kept away from light except when being used with a tracing.
- 3 - The tracing is placed against the glass in a frame, so that it reads properly when looking at it through the glass.
- 4.- The sensitized paper is placed right back of the tracing, chemical side next to the tracing.

- 5 - It is exposed to sunloght for perhaps a minute and a half
(watch the color of the paper and try it out with small samples before attempting a large print.)
Artificial light - electric is more satisfactory because of its uniform intensity.
- 6- Wash out the tracing by lightly splashing water over it, or by drawing it through water. This may take a minute or two - wash it until the soluable chemical is all washed out.
- 7 - Classify or intensify the colors, using a small amount of saturated solution of potassium chromate in the water bath.
- 8 - Hang up the blue-print in the shade to dry.
- 9 - Do not get water on tracing cloth. It will dissolve the size and cause white spots in blue prints.

V. Lettering:

- 1 - Use only one style, such as a single line Gothic - upper case and lower case.
- 2 - Use either vertical or inclined lettering but preferably teach one or the other as the time is s too limited to teach both well.
- 3 - Use aids such as alphabet sheets that are sent out free of charge by some manufacturers of drafting supplies.
- 4.- Take a little time to show the basic strokes used in lettering

VI. Isometric Drawing:

- 1 - Advantages of isometric sketches.
- 2 - Use of isometric paper

VII. Standard Sizes in Paper:

- 1 - Use sozes that are multiples of each other
- 2 - That can be handled and stored conveniently.

VIII. Colored Papers

A cream or buff colored paper will show soiling less than will white paper.

IX. Protect prints if mounted with transparent shellac.

Laboratory Work in the Shop:

1. Woodworking.

Projects from the standard texts, from U. S. Department of Agriculture and Station bulletins and elsewhere are used which involve the following processes:

- (a) Laying out work on board.
- (b) Sawing (rip and cross cut.)
- (c) Planing
- (d) Chiseling
- (e) Use of brace and bits, including expansion
- (f) Nailing, bolting, screwing pieces together.
- (g) Use of special hardware as hinges, hasps, hooks, eyes, braces, corrugated fasteners, dowels, etc, etc.

2. Metal Work.

A. - Hot Metal Work.

- (a) The forge, parts, care, use
- (b) Hand tools, hammer, wedge, hardie, etc.
- (c) Projects such as chain repair, heading bolts, making welds, tempering, etc, etc.

B. - Cold Metal Work

- (a) Use of past drill, drill sizes, etc.
- (b) Threading bolts, use of bolts and rivets.
- (c) Pipe fitting, plumbing, parts methods etc.

C. Sheet Metal Work

(a) Layouts

(b) Tools

(c) Soldering

1 - Irons

2 - Blow torch, charcoal furnaces, etc.

3 - Fluxes

4 - Method, etc.

3. Concrete Work

(a) Ingredients, use, selection

(b) Proportioning, theory, practice.

(c) Mixing

(d) Planing

(e) Forms and mixing boards

(f) Reinforcing

(g) Curing

4. Rope Work

(a) Ropes, history, manufacture, etc.

(b) Knots, splices, hitches, Pulleys and hoists.

5. Leather Work

(a) Tools, hides, care, etc.

(b) Fittings and fastenings.

6. Miscellaneous

(A) Window and screen repair

(1) Glass cutting

(2) putty

(3) Screen wire, etc.

B. Sharpening Tools

- (1) Edged tools
- (2) Saws, hand, cross cut, circular, etc.
- (3) Screw drivers, auger bits, etc.

The following directions are to supplement or to take the place of description of operations which are found in the Standard texts books on the subject and are used at time of assignment to the project or in some cases at the preceeding laboratory period.