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MANUAL TRAINING REPRINTS

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SERIES A NUMBER 2

COPING SAW WORK

By

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MANUAL TRAINING REPRINTS.

The persistent demand for certain numbers of the *Manual Training Magazine* has led to the conclusion that some of the articles in these numbers ought to be reprinted. Moreover, it is believed that from time to time in the future the *Magazine* will publish articles which owing to their special value ought to be reprinted soon after they appear in the *Magazine*.

To supply this evident need the Manual Training Reprints have been planned and will be issued at irregular intervals as the demand may warrant.

The Reprints will be arranged in two series, as follows:

Series A. Illustrated articles of special practical value for class use.

Series B. Discussions having special permanent value, or such as supply needed data to students preparing to become teachers.

Those already published are the following:

SERIES A.

No. 1. The Construction and Flying of Kites. By Charles M. Miller.

No. 2. Coping Saw Work. By Ben W. Johnson.

INTRODUCTION.

MANY a teacher can recall his boyhood enthusiasm in getting a subscriber to the *Youth's Companion* in order to secure the prize of a bracket-saw and collection of designs. He can also recall the busy, happy hours spent with that saw, how he mastered one difficulty after another until finally he could saw out the parts of an intricate pattern and fasten them together neatly and securely. As these early experiences are brought to mind he is likely to ask himself this question: "If the use of the bracket-saw stimulated so much effort in me and was the means of so much good training, why should not this tool be utilized in our manual training classes at the present time?" Many attempts have been made to answer this question by showing schemes of work involving a saw of this general type, whether called bracket-saw, fret-saw, or coping-saw, but no one has presented so convincing an answer as B. W. Johnson in his "Coping Saw Work." Other schemes have been suited to special schools, working under favorable conditions, but Mr. Johnson's has been adapted to the public schools of a large city and developed in the spirit of modern pedagogy.

In the introductory part of his article, Mr. Johnson refers to the Eva Rohde System. In February, 1891, Miss Rohde of Gothenburg, Sweden, wrote a brief chapter on her "Model Series" which was published the following year by the American Book Co. in "The Sloyd System of Woodworking," by B. B. Hoffman. This series was an attempt to bring the benefits of sloyd down to children from five to eight years of age. The course consisted of small toy representations of household articles, a leaf form, a fish, and the acrobat model. Two years later, 1893, full-size drawings of her revised series, involving many animal forms—some of them with joints, as the pig, horse, boy, soldier, and sawyer—with text in Swedish and English, were published in Gothenburg, and the same year a photograph of the models was published by the State of Massachusetts in the report of the Commission appointed to investigate existing systems of manual training and industrial education. In this same report was published a sixth-grade course by Frank M. Leavitt, which involved "flat work" in which a bracket-saw was freely used. At this time an experimental course involving

the bracket-saw was being developed at Teachers College, New York City. The two latter courses were confined to geometric forms. The same was largely true of the fret-saw work in the "Berlin Course of Easy Woodwork," translated and published in London by O. Newman & Sons in 1895, tho in this course a strong appeal was made to the constructive interests by bringing into the series of models a wagon, a cart, sand mill, bird house, steps, sled, windmill, bow-gun and even the acrobat. At Pratt Institute Frank H. Pierce has developed a scheme of work giving emphasis to problems with freehand outlines similar to some of the animal forms found in the Eva Rohde System. And now comes Mr. Johnson's scheme, which demonstrates that he, more than any of the rest of us, has caught the play spirit—the child's point of view, in this work. He has given us models which are full of fun for the children, afford ample means for training in form study, construction, invention, and careful work. Moreover, his course involves so many mechanical principles that he might with considerable propriety entitle his article "Applied Mechanics for the Fourth Grade."

—THE EDITOR.

COPING SAW WORK.

SOME three years ago the need arose in the fourth grade for a more vigorous and adaptable form of handwork than the use of raffia. As the children of this grade based much of their work upon local geography, history, and the development of native industries, of which lumbering is chief, the use of thin wood with simple tools was suggested.

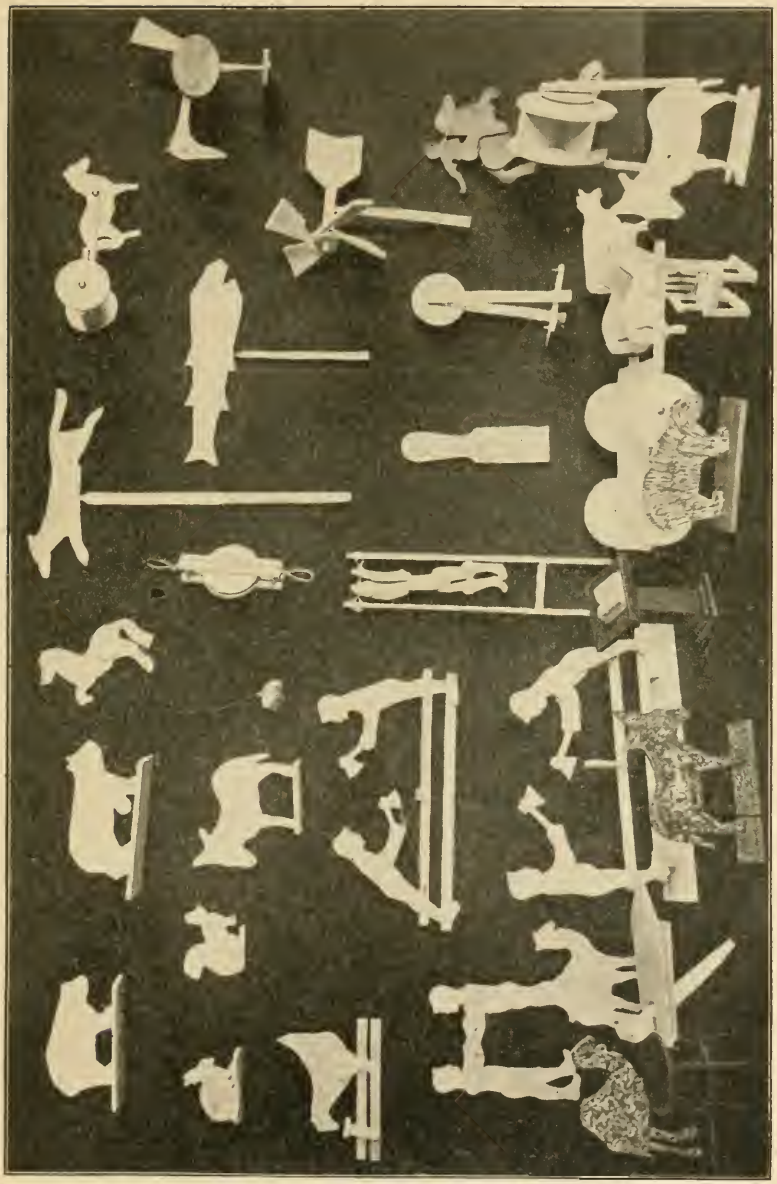
We had seen children of this age use a coping saw successfully in Miss Langley's classes at the School of Education, Chicago University, and in Mr. W. J. Standley's work in the Y. M. C. A. day classes, at Portland, Oregon. Our problem was to devise a suitable equipment for the regular teacher to use with forty-eight children in the ordinary classroom, and a course of work, teachable in her inexperienced hands, of real merit, educationally, in the development of the child. After experimenting a term or two in different schools, the following equipment and course was devised. The unusual interest and delight of the children in this work, together with the success of the teacher in presenting it, led to its adoption for all the fourth-grade rooms in the city, about fifty in number.

There is much similarity in this work to that of the Eva Rohde System, taught in the *Praktiska Arbetsskola* in Gothenburg as early as 1891. The use of a fret or coping saw for most of the cutting, the use of a pattern or template laid on the thin wood by the child and marked around, and the use of toys for models are points in common. The

CHEST FOR HOLDING EQUIPMENT.

course followed here, however, requires many less tools, is used in an ordinary school room of forty-eight pupils and not in a specially equipped shop with only fifteen or twenty pupils, as in Gothenburg, also less consideration is given to the sequence of model and tools and for mechanical and geometrical accuracy.

The equipment consists of 48 coping saws, 48 saw tables, 48 iron clamps, 2″, to hold the table on the desk, 12 small tack hammers, 12 half-round cabinet files, 12 eagle compasses, No. 576, 12 sloyd knives, 6 Stanley try-squares, 4½″, 6 brad awls, 3/16″, and 1 pair of Bernard's cutting pliers. For supplies the following is required: Wire brads ⅜″ and ½″ No. 20, liquid glue, ½ pint, soft iron wire No. 16, sand paper No. 1, cottonwood boards, ⅛″ x 6″ x 12″. Cottonwood is used because the cheapest available wood for this purpose. Bass and yellow poplar would be better, having less stringy fiber.



COPING SAW WORK—FOURTH GRADE, SEATTLE, WASH.

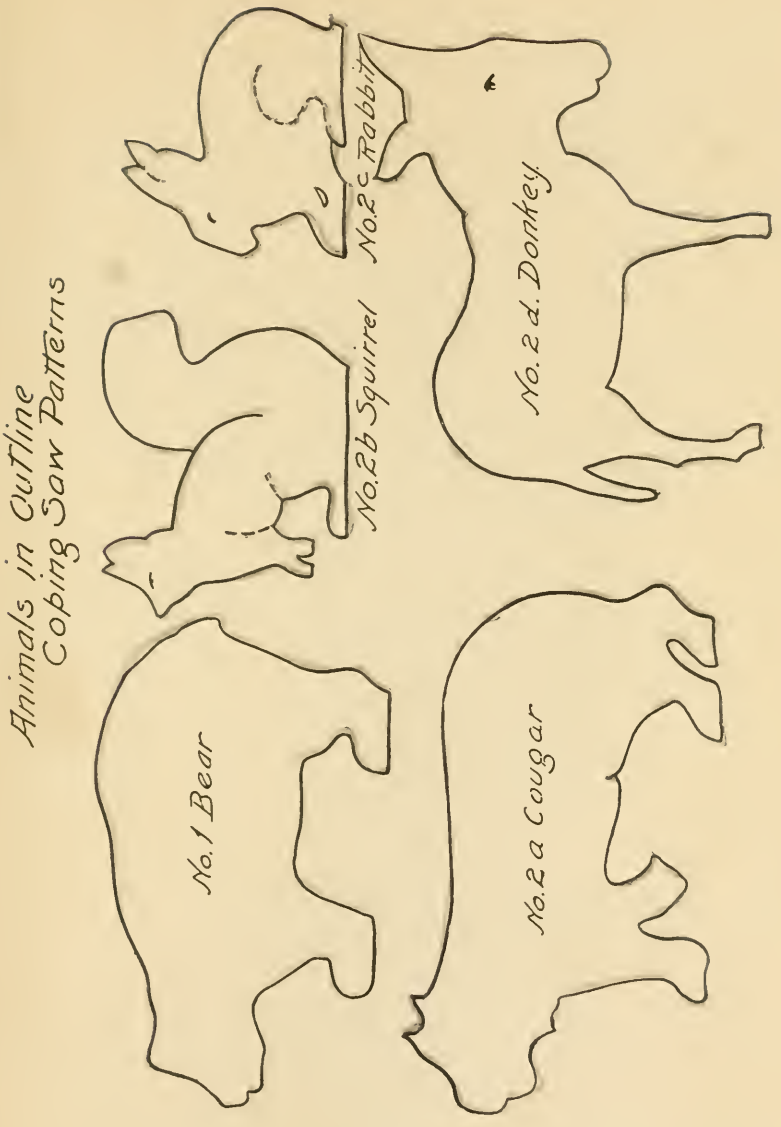
This equipment is kept in a chest 13½″ x 18″ x 30″, that rolls easily on casters. The saws and clamps are kept in 6 tray-like boxes, and these with the saw tables can be distributed by the six monitors in less than two minutes and the whole room be at work in less than five minutes. The cost of the outfit complete is about $35.

One period of sixty minutes per week is given for this work. The children ask for more time and many of them buy their own saws with a dozen blades for twenty-five cents at any hardware store, and make many interesting forms at home, using material taken from empty cigar, fruit and grocery boxes picked up at the corner grocery. Home work of this sort is encouraged by having such work exhibited for the other pupils to see and comment upon.

The course followed is shown in the diagram. The purpose of the work here, as in all other grades and forms of handwork, is to give educational direction to the child's natural constructive tendencies by using forms that are of interest to the pupil, and taken from his play, home, school and the industrial life about him.

The effort is made to have the forms chosen come to the pupil as *problems in construction to be solved by him,* and in the solution of which he will acquire skill, the power to create, and a growing appreciation of the constructive work in the world about him. The skillful teacher will relate this work to the other school subjects whenever practicable and teach the elements of good form and proportion, the need of drawing, the written language of form, the value of number in accurate application, and develop an awakening interest in the industries that are founded on these materials and processes. In fact, this last may easily be the leading avenue of approach in placing this subject in the curriculum.

Referring to the diagram the first column indicates in outline what we are to teach. The tools and some skill in their use and a knowledge of the limitations of the material are pre-requisite to any individual power of expression or creation. For the sake of analysis, the tools and the processes are grouped, and the sequence largely based on the idea of construction rather than on tool dexterity. The tools are few and are quickly mastered, but the possibilities in form and combinations of parts keeps the child mentally alert to solve the mechanical problems that come to him. As we have to deal with classes, and the same knowledge about the tools and the correct processes is necessary to every child, the


Animals in Outline
Coping Saw Patterns
No. 1 Bear
No. 2 a Cougar
No. 2 b Squirrel
No. 2 c Rabbit
No. 2 d. Donkey

COPING SAW WORK.—Seattle Public Schools.

Group	TO TEACH	MEANS		
		CLASS EXERCISE	PROBLEMS SUGGE	
			PLAY	HOME
I.	The Tools, their care. Saw, why it cuts, etc. Pencil, Ruler, Patterns. Laying out work, economy of material, grain of wood, its strength. File. Sandpaper—kinds to use on a block. Try-square, Knife, Hammer—how to use.	1. Saw out animal forms. Bears. (Have pupils understand what they make.)	2 and 3. (The pupil to select any to make.) Cougar. Rabbit. Squirrel. Donkey.	
		4. Stand. (Keep corners square.)	5. Make different kinds to suit a vise a new support.	
II.	Construction. "Putting together." Awl—its use. Brads — sizes. Glue — what it is, why it holds.	6. Balancing Horse. (Why he balances. Physical law—explain ships, icebergs, circus rider, etc.)		
		7. Horse and Cart. (Class direction in making wagon.)	7a. Optionals: Four-wheeled Cart.	
III.	Construction. Movable parts — mechanical motions.	8. Feeding Chickens.	9. Woodchoppers, or Wrestlers.	(Egg crates, f Encourag
		10. "Dinkey Bird."	10a. Optionals: Athlete.	
			(Figures may be painted with water c	
IV.	Construction. Accurate adjustment.	11. Pencil Sharpener. (Require accurate drawing and measurements.)		12. Calendar Strike.
		13. Toy Furniture. Bench. Tables, Chairs, Cradles, etc.	(For design, consider with the class Different pieces may be made	

Note: Other problems may be added by teacher or pupil if suitable to the group. The pupil should always progress in his choosing.

COPING SAW WORK.—Seattle Public Schools.

APPLICATION IN CONSTRUCTIVE PROBLEMS

DIVIDUAL SELECTION		MATERIALS	DRAWING REQUIRED
SCHOOL	INDUSTRY		
from home patterns or pictures of others		Cottonwood. Kind of tree, its use. Leaf and branch, may be drawn. Sandpaper.	Use a large drawing to show just how to place the pattern on wood.
zle Maps or Pic-ures.			
using scraps of wood. See who can de-		Cottonwood. Where does it grow.	Large drawing—pupils to copy by dictation on paper, then on the board.
	6a. Pulleys. Weather-vanes (optional).	Cottonwood. Brads, 3/8" No. 20. Iron Wire, No. 16. Small stone.	Large drawing to show the "lay out." Patterns used.
	Wind-wheels. Conveyor. Light House.	Cottonwood. Brass Tacks.	Large drawing of cart. Pupils work from it by directions. Show how to "lay out."
boxes make good material for home work. .)		Cottonwood or Cigar Box Wood (red cedar.)	Large drawing of supports. Patterns for figures.
	Scales.	Cottonwood.	Large drawing of parts—patterns as indicated.
		Cottonwood or Cedar or Spruce.	Large drawing. Pupils copy.
ons of real furniture and reduce in size. children.)		Cottonwood or Cedar or Spruce.	Large drawing. Pupils copy.

means (given in the next column) used to convey this knowledge is a class model which all the children make under the careful supervision of the teacher to see that every child is forming the right habit in the use of the tools, and understands what he is doing and why he does it.

The next step and a very important one, and the basis, I believe, of any successful method of education, is to give the child an opportunity to work out individually his newly acquired ideas in a field of choice as free as conditions will permit. He now faces a new situation. He must determine how to meet it. It is this repeated experience in the course that will aid in developing his power of initiative, and begin to form a habit of successful attack. Such a habit may even have a moral significance in the other experiences of life, though seemingly not related to this one technical experience.

To accomplish this, problems for individual selection are given as shown in the diagram. To aid the teacher and pupil, these problems are divided or grouped according to their dominant interest as well as according to their mechanical and technical difficulty. No attempt is made to "split hairs" in this analysis, but such problems are selected as will emphasize what the child should know and also tax his ability in applying it as far as he has been taught in the process. That we may not forget the child, the four dominant interests—play, home, school and industry interests, that actuate us all in anything we do, are given and the problems arranged under each according to which one it seems to serve best. Naturally in the fourth grade the play interest is dominant. But we must see to it that the others are not forgotten for the sake of the man and woman of tomorrow.

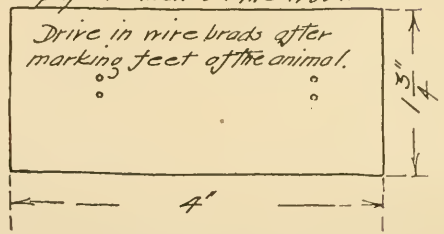
The remaining two columns, as indicated, help the teacher in the choice of material and its use, and to know what drawing should be presented and executed.

These problems for individual selection may be changed, or others added or substituted by both teacher and pupil, provided they are suitable to the group in which they are placed. Thus the teacher is free to make the course meet local conditions and carry out her own initiative, untrammeled by a series of set models. Her only limitations are those imposed by her lack of skill, the requirements of the material and the best accepted processes used to embody the idea in that material.

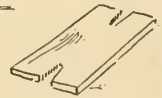
This plan also permits the bright pupil to work to full capacity unchecked by the dullest pupil and gives the slow pupil as much oppor-

Coping Saw Patterns

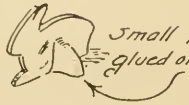
No. 4. Stand.
Have the pupil draw from large drawing first on paper then on the wood



No 5. Make different stands to suit the animals made, using scrap pieces of wood. See who can devise a new support.

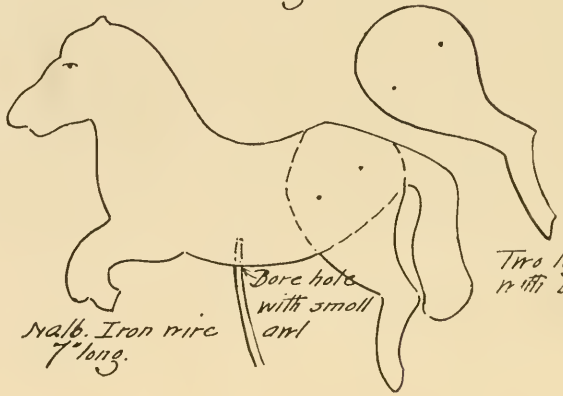


Foot of Animal fits in here



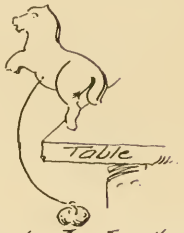
Small piece glued on back.

No. 6. Balancing Horse

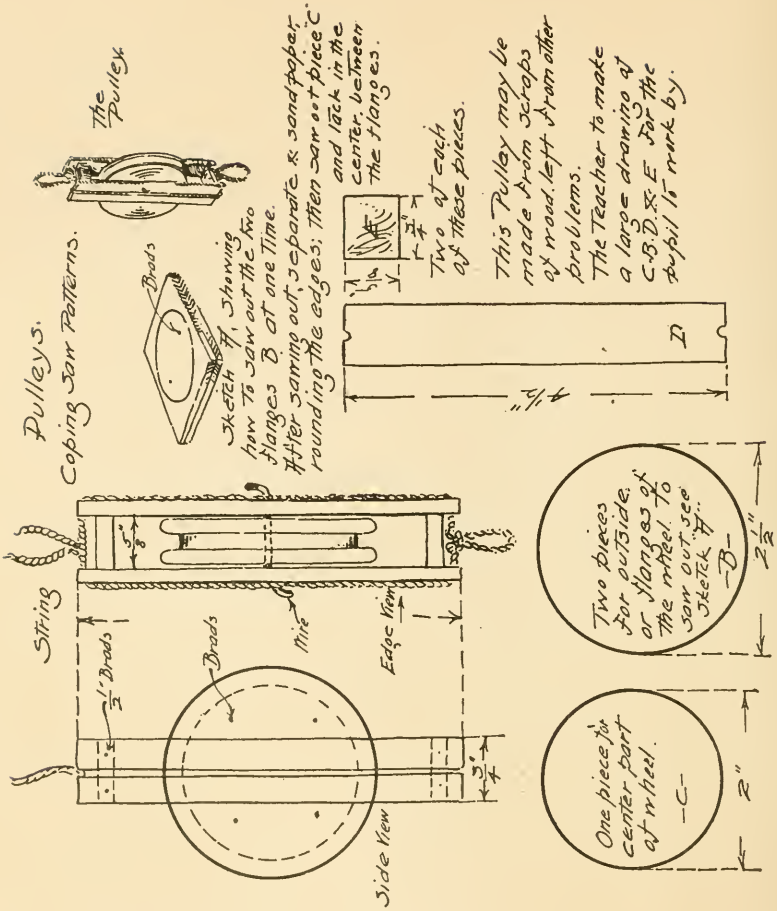


Nail 6. Iron wire 7" long.

Two legs, fastened with brads & glue

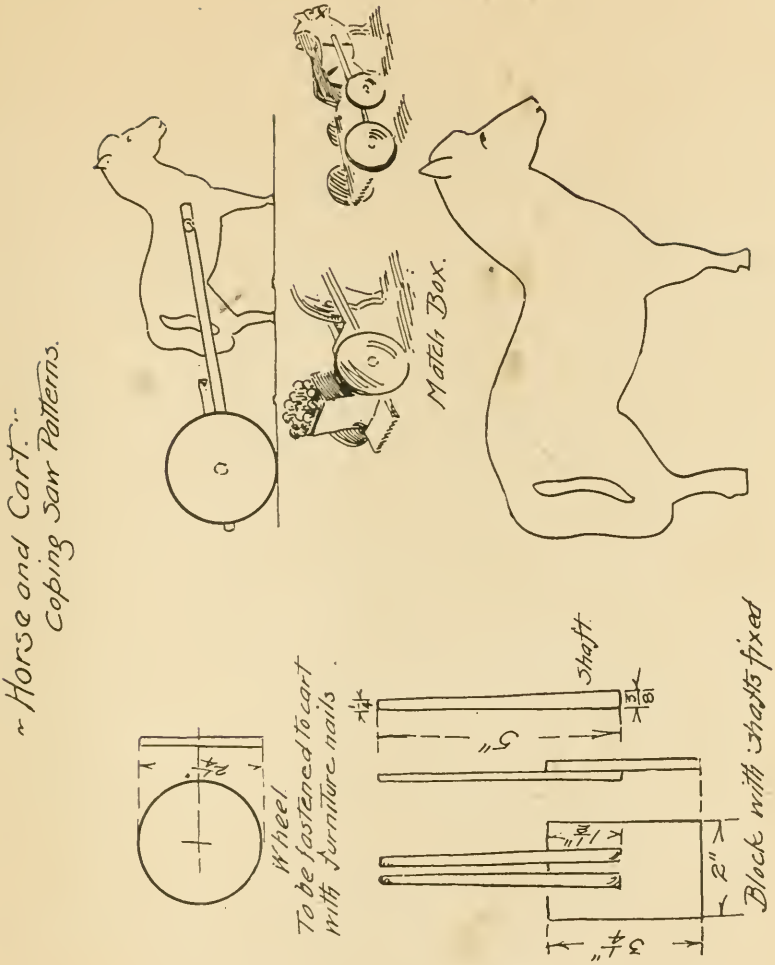


Small stone with loop of string glued to it.

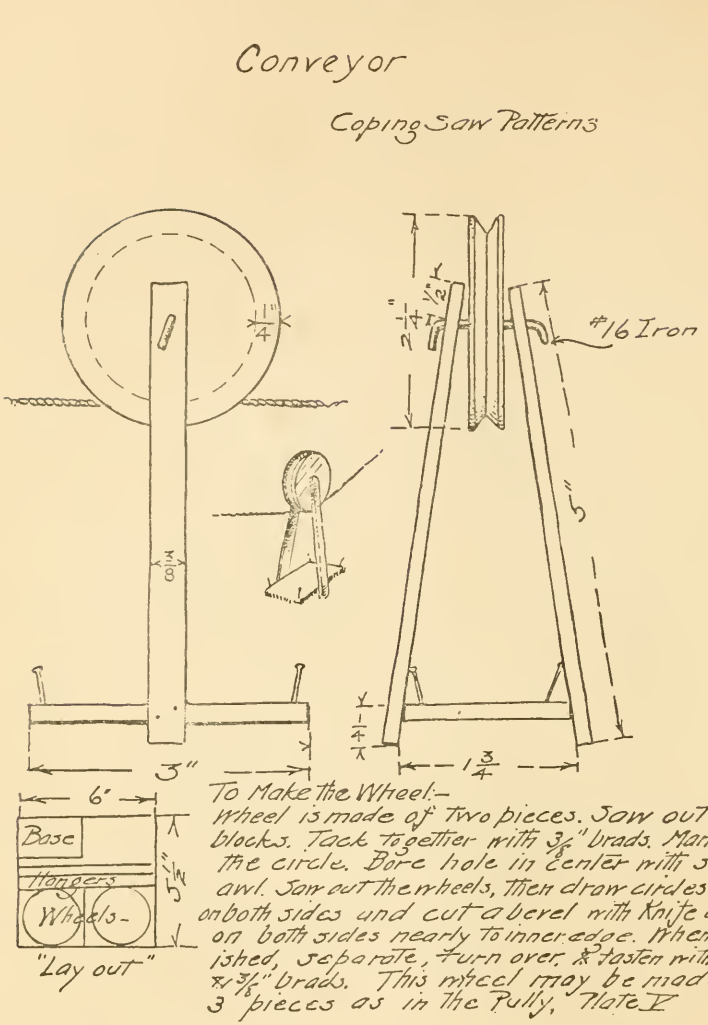


tunity as he can use; for as soon as the pupil finishes the class piece he goes to work at once upon the problem of his choice. If he is bright and capable, wise advice will lead him to select a problem well worth his ability. In fact, he may make several pieces before the class as a whole is ready to take up the next step together in the next class exercise.

The sequence followed is indicated by the figures. This sequence is not one of technique solely, but of a constructive idea that passes from simple forms to more complicated expressions, and the process is a means to this end.



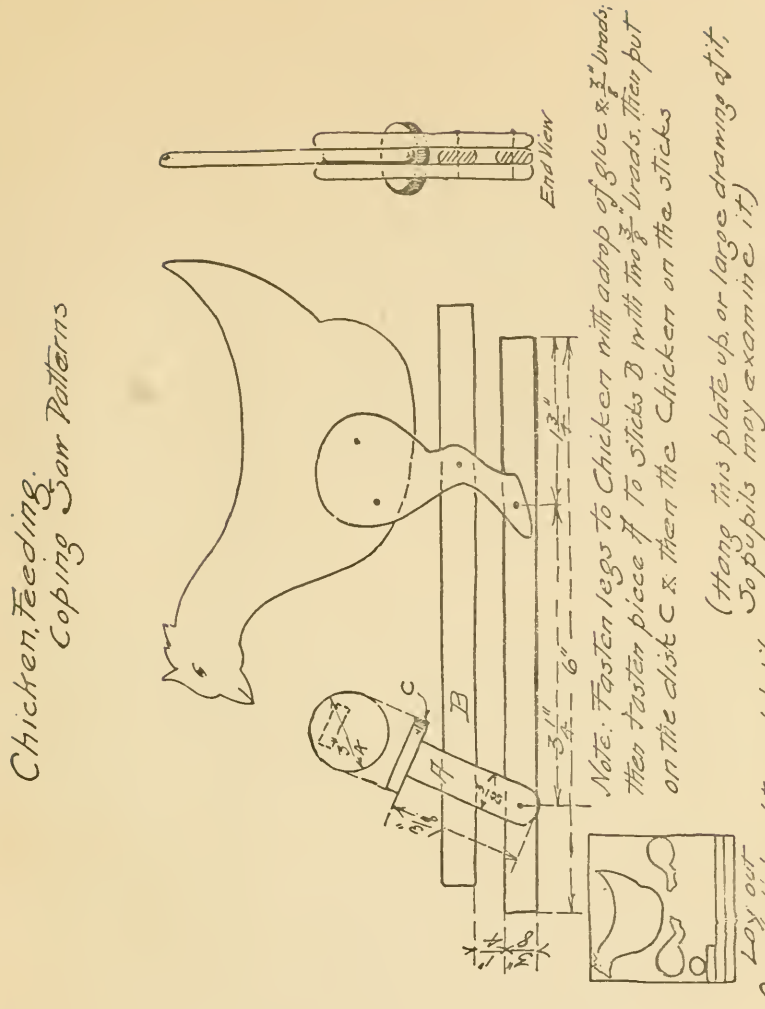
The writer fully appreciates the difficulties of this plan of presenting many models that may be made compared with giving a sequence of eight, ten or twelve models to be carefully followed. The limits of this paper do not permit of further detail concerning the way the point of view and methods of work are given to the teachers. The few of the teachers who do not for one reason or another get hold of this plan do no worse than under the old formal lock-step method, and many who do not succeed with it are able to accomplish much more than for-



merly, both in the amount and quality of the work, as well as in developing a greater interest and power on the part of the pupil.

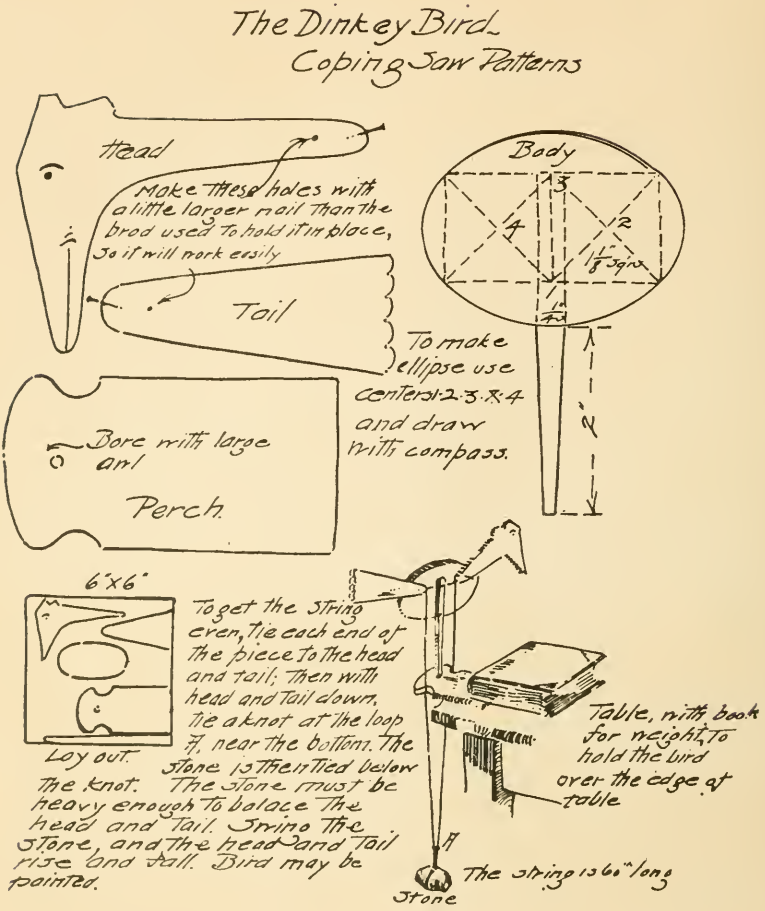
This diagram course is the "chart" for the teacher "to steer by." The necessary direction for making these models is given by means of hectograph sketches, some of which are here illustrated, and by monthly meetings with the teachers.

The amount of interest a child may take in any activity is not al-



ways a sure indication of its success, as an educational means. But interest is the key that unlocks the world, and the line of greatest effort is that of deeper interest. The touchstone of life comes when the self-conscious mind perceives that interest awakened in one line, in the last analysis, touches all others, and that we may interest ourselves in any good thing we wish to.

That the children, girls and boys alike, are interested one or two



instances will illustrate: In the mid-year a room lost its regular teacher and a substitute took her place for the balance of the term. The coping saw lesson came a day or so later, before she could find out what and how to carry on the work of her predecessor, so she frankly told the children they would omit the lesson for that week. They protested, assuring her they could manage it all right and show her what to do. She was wise and anxious to learn from any source, so the hour went off with everyone very busy—profitable to all concerned.

In another school meritorious conduct and attendance is rewarded by stars conspicuously placed, and when thirteen unbroken spots are covered they get a half holiday Friday. It happened the particular Friday was particular in other ways, and they would miss their coping saw hour, so they voted to spend the holiday in school sawing wood.

The soul-satisfying cry, "it works," the cry that opens the way to still greater accomplishment, startled a principal in her office, the other morning, as a small boy rushed in, face and eyes shining and held towards her his "athlete" that would "perform" as he had made it to do. There is great value in some of our school work having a standard of excellence that even a small boy can appreciate.

In conclusion the writer claims no originality for this work other than its adaptation to this situation. Most of the models used and the methods of the course and its analysis are the result of observations made of what others have done along similar lines. It is not the end, but only the beginning.

Books on the Manual Arts

Beginning Woodwork. At Home and in School. By CLINTON SHELDON VAN DEUSEN; illustrated by Edwin Victor Lawrence.

A full and clear description in detail of the fundamental processes of elementary benchwork in wood. This description is given through directions for making a few simple, useful articles suitable either for school or home problems. Even without a teacher a bright boy, by following this book faithfully, may acquire considerable skill. It is a safe guide for farmers' boys as well as for city boys, and is especially well suited for use in rural and village schools in which the teacher has had but little experience in the use of woodworking tools. The book is illustrated by more than one hundred figures, including ten plates of working drawings. Each of these figures is an original drawing made expressly for this book. Price, $1.00.

Essentials of Woodworking. By IRA S. GRIFFITH; illustrated with numerous pen drawings by Edwin V. Lawrence.

This is a comprehensive textbook on woodworking tools, materials and processes, to supplement, but not to take the place of, the instruction given by the teacher. The book contains three parts: I—Tools and elementary processes, including laying-out tools and their use, saws, planes and their use, boring tools, chisels, grinding and whetting, form work, laying out duplicate parts, scraping, sandpapering, and fastening parts. II—Simple joinery, including directions for making the common joints, elementary cabinet work involving drawer construction, paneling, rabbeting, and door construction. III—Wood and wood-finishing, including a great amount of information that should be given to a student along with his work in wood. The book does not contain a course of models. It may be used with any course. Price, $1.00.

Problems in Woodworking. By M. W. MURRAY.

A convenient collection of good problems ready to place in the hands of the pupils. It consists of forty plates bound in heavy paper covers with brass fasteners. Each plate is a working drawing, or problem in bench work that has been successfully worked out by boys in one of the grades from seven to nine inclusive. Many of the problems can be worked out in various ways according to the individual ability, interest and taste of the pupil. Price, 75 cents. Board covers, 20 cents extra.

Problems in Furniture Making. By FRED D. CRAWSHAW.

This book consists of 32 plates of working drawings suitable for use in grammar and high schools and 24 pages of text, including chapters on design, construction and finish and notes on the problems. Price, in heavy paper covers, $1.00. Board covers, 20 cents extra

Problems in Mechanical Drawing. By CHARLES A. BENNETT. With drawings made by Fred D. Crawshaw.

This book consists of 80 plates and a few explanatory notes, and is bound in heavy paper covers with brass fasteners. Its purpose is to furnish teachers of classes beginning mechanical drawing with a large number of simple, practical problems. These have been selected with reference to the formation of good habits in technique, the interest of the pupils, and the subjects usually included in a grammar and first-year high school course. The book covers simple projection—straight lines and circles, problems involving tangents, planes of projection, revolution of solids, developments, intersections, isometric projection, lettering and working drawings. Each problem given is unsolved and therefore in proper form to hand to the pupil for solution. Price, $1.00. Board covers, 20 cents extra.

Books on the Manual Arts

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