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# Reinforcement therapy program in preparation for vocational training

Joseph Paul Ingrao

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A REINFORCEMENT THERAPY PROGRAM  
IN  
PREPARATION FOR VOCATIONAL TRAINING

by  
Rev. Joseph Paul Ingrao, C.S.C.

A RESEARCH PAPER  
SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF  
MASTER OF ARTS IN EDUCATION  
(EDUCATION OF MENTALLY HANDICAPPED)  
AT THE CARDINAL STRITCH COLLEGE  
Milwaukee, Wisconsin

1969

This research paper has been  
approved for the Graduate Committee  
of the Cardinal Stritch College by

John H. Rothenstein  
( Adviser )  
Date July 17, 1968

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Finally, to all the Sisters and children at Saint Coletta, the investigator expresses profound appreciation for their encouragement and prayers.

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## CHAPTER I

### INTRODUCTION

During the past decade an increasing volume of literature has reflected the widespread interest of educators and habilitation counselors in prevocational and vocational training of the mentally retarded adolescent.

If the school is to achieve its educational objectives, it must not only be responsible for teaching of academics, but also for the individual's personal, social, vocational growth, development, and adjustment. Vocational training should be thought of as a general training in habits, attitudes and skills which are desirable in an employee. Such traits as, punctuality, getting along with peers and employer, responsibility in following directions and accountability of completing the task most strongly effect performance. A prevocational or vocational program should develop skills and attitudes which will enable the mentally retarded adolescent to become an efficient employee.

The mentally retarded generally have decreased ability in the transference of learning from school to out-of-school living. Therefore, the mentally retarded adolescent requires much more assistance to span the gap between classroom experience and experiences they will face as persistent life situations arise. In order



to accomplish this a prevocational program should be designed to provide the kinds of learning situations that the mentally retarded adolescent will face once he is placed in a work-a-day setting.

Current development in research has shown a new surge of learning techniques. Such techniques are labelled as behavior therapy, behavior modification, reinforcement therapy or operant conditioning. Investigators with the mentally retarded have found this sort of therapy of great value. Reinforcement therapy has succeeded in increasing the mentally retarded individual's performance where other methods have failed.

#### Review of Literature and Discussion of Techniques

Reinforcement therapy as a means to behavior modification is not a new technique. The problem of usage has been one of a lack of definition and a systematic application of current learning principles, Mazik, MacNamara, 1965; Travers, Ried and Van Wagen, 1966. Research has shown that if behavior principles are clearly delineated and utilized in the systematic training of human beings, performance becomes more effective, Watson, 1965.

During the last few years the concept of reinforcement has had a substantial impact on learning theories. For the purpose of this study reinforcement principles need defining. The primary principle of reinforcement therapy basically dictates that a reward be given for certain response so that the probability of that same response recurring will be increased. Giving of praise or some-

thing of value when a person has effectively performed a given task are examples. Immediacy of reward is considered a basic part of reinforcement, since it may affect intermittent behavior between the response and the reward, Mazik, MacNamara, 1965.

Reinforcement may be given in two ways: continuous and intermittent. Continuous reinforcement refers to reward given to a subject each time an appropriate response occurs. Intermittent reinforcement refers to a periodic reward. Essentially there are two types of intermittent reinforcements: interval reinforcement or ratio reinforcement. Intermittent reinforcement may be given at a fixed time, (interval reinforcement) that is, "every Monday I'll check your work," or it may be a fixed ratio, (ratio reinforcement) namely, "whenever you have finished a work unit, I'll check what you have done." Such reinforcement given periodically to the subject establishes and maintains responses of greatest strength, Amanson, Bijou and Capoe di, 1959.

Types of reinforcement are generally referred to as being positive or negative, Skinner, 1953. A positive reinforcement is a stimulus which when added to a situation strengthens the probability of an operant response, such as, food, water, or sexual contact. A negative reinforcement is a stimulus which, when removed from a situation strengthens the probability of an operant response, such as, a loud noise, a very bright light, extreme heat or cold, Hilgard and Bower, 1966.

A simple and cursory explanation of reinforcement principles has been given. Yet, one cannot conclude that it is the

"point of no return" to behavior modification. Certainly, in all learning theories one must consider the effects of "expectancy" and "imitation", and the role these two theories play in modifying appropriate behavior and the effect they have on performance. According to expectancy theory the "behavior of a person is determined not only by the nature or importance of the reinforcement value, but also by the person's anticipation or expectancy that these goals will occur." Rotter, 1954, p.102. Several research studies have shown the use of Rotter's Expectancy theory, Kliebhan, Sister Joanne Marie, 1966. The impact of such a theory on motor performance tasks of the mentally retarded cannot be ignored. "Imitation theory is concerned with observational learning -- the tendency of a person to reproduce the actions, attitudes or emotional responses exhibited by real life or symbolized models", Kliebhan, Sister Joanne Marie, 1966, p. 102. "In imitation learning, behavior patterns are typically acquired in their entirety --- the learner reproduces the model's entire response pattern", Kliebhan, Sister Joanne Marie, 1966, p. 3. Miller and Dollard indicate that these theories are effective as a condition of learning and thus modifies behavior. For the purpose of this study such theories are of tremendous value.

In recent years widespread interest in the development of greater opportunities for the mentally retarded has led to a modified form of education to assist in the fullest the development of the subject's capacities. It should be recognized that any program concerned with training must also be oriented or

related to the vocational, social, psychological and educational needs of the mentally retarded adolescent. Investigation of these needs have been reported in literature by Kolstoe, 1961; Jacobs and Weingold, 1967.

To more favorably increase the odds of fitting the right person to the right job, and so to aid the mentally retarded adolescent in the acquisition of simple manual skills, a pre-vocational training program should be developed. Development of such a technique will help in the investigation of mentally retarded adolescent's potential in gainful activity.

#### Statement of the Problem

It has been found in several studies, Stevenson and Pirojnikoff, 1958; Steigman and Stevenson, 1960, that different pre-training schedules result in general response tendencies which facilitate performance. The purpose of the present study was to determine if performance of a selected group of mentally retarded adolescents can be influenced by prevocational training utilizing reinforcement therapy techniques.

Several questions are raised. First, whether the investigator is able to study and delineate behavior characteristics of the selected mentally retarded adolescents. Second, whether behavior can be modified by prevocational training utilizing a reinforcement therapy program. Third, whether prevocational training influences performance of the mentally retarded adolescent.

## CHAPTER II

### PROCEDURE

A description of subjects; subjects' psychodiagnostic profile; the general design of the experiment; a description of experimental projects; and methods follow:

#### The Subjects

The subjects were eight mentally retarded adolescent boys. Five are living on campus, Saint Coletta School for Exceptional Children, Jefferson, Wisconsin. Three "day-hops" are living at home.

Etiologically, the subjects classified as familial and mongoloid types of retardation according to the AAMD classification system, Heber, 1961.

IQ-wise, the subjects fall into the educable classification, Heber, 1961, but due to learning, maturation, performance and social adjustment, were not placed in the regular educable classroom system. The subjects were assigned to the "A" and "B" non-academic secondary level.

All eight subjects were free from gross motor, sensory, and emotional disturbances.

### Psychodiagnostic Profile of Subjects

It is particularly relevant in the present study to have a clear picture of the eight selected retarded adolescent boys who took part in the experimental "Reinforcement Therapy Program". It is helpful to study selected individual cases which may contribute to an understanding of some of the reasons why success may or may not have been achieved with certain individuals.

A brief Psychodiagnostic Profile of subjects are here presented for this purpose.

#### CASE I (C.A. 14-3; I.Q. 57)

A.A. has a friendly, outgoing manner combined with politeness which helps him to make a good impression on others in the group. Verbally A.A. is quite high and has ability to immediately recall, but his mind quickly wanders off to something else. He is able to elaborate extensively and gives the impression of having more intelligence than he measured on a test. A.A. was given the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test. On all three tests A.A. scored quite low. It was clearly seen that A.A.'s attitude toward the task at hand was poor, his quality and quantity of performance was also very poor. Comprehension, understanding and following directions was scored poor. A.A.'s distractibility and frus-

tration level was extremely low. When A.A. was highly motivated, it was seen that he performed much better. A.A. is an overprotected youngster, who has never been given personal responsibility.

CASE II (C.A. 15-11; I.Q. 56)

B.B. is a "mild" mongoloid, hyperactive, well-mannered and pleasant. Socially, B.B. is very immature; due to this fact, he does not get along with some of his classmates. IQ-wise, B.B. rates 56, which is educable material. B.B.'s learning and comprehension is fair, but due to his inconsistency, one would tend to rate him poor. He has a very short attention span and is easily distracted. His language behavior and communicability are markedly impaired; due to this fact, he becomes irritable, aggressive and completely frustrated, which adds much to his behavioral problems in and out of school. It was seen on the Hand and Tool Texterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test that B.B. can best perform jobs that require manual dexterity.

CASE III (C.A. 15-9; I.Q. 65)

J.B. is higher in level of capability, intelligence and social maturity than most of the other boys in the program. Verbally, J.B. is quite high. He possesses an "I know it all" attitude, and loves to exhibit his knowledge before the group; here he excels knowing he has the attention of the entire group. The "I know it all" attitude is disliked by the other members, and

THEY DO NOT HESITATE TO LET HIM KNOW. Due to his hyperactivity, J.B. has a very low attention span, which adds much to his behavioral problems in a classroom situation. His visual memory and memory span was low. It was clearly seen in the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test that J.B.'s comprehension, understanding directions were fair, but his concentration, recall and following directions were rated poor. J.B. begins a given task enthusiastically, but becomes bored within minutes; results, task hurriedly done, quality and quantity of performance is poor. J.B. is quite a leader in spite of the fact that he is an exhibitionist.

CASE IV (C.A. 15-8; I.Q. 50)

D.C. is a frightened, confused, passive and somewhat withdrawn youngster. His speech was rambling and circumstantial, and suggested only a very tangential relationship with reality. He gives the impression of living in a private world, and only very infrequently coming out for contact with others. D.C. was slow moving, slow thinking, speech markedly impaired, all of which gives a vivid impression of dullness. In the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test, D.C.'s performance was very poor. His comprehension, understanding and recalling directions were poor; manipulation of tools, eye-hand coordination poor. His finger dexterity, especially in the right hand, was extremely poor. His sense of directions is practically "nil". With regards to his performance, he would try to do what was expected of him, but his abilities



were very limited, and therefore, became extremely frustrated.

CASE V (C.A. 16-1; I.Q. 76)

J.G. is one of the brightest boys in the program, excitable, generous and cheerful. He is functioning in a moderately mental level, and has been placed in special education because of limited academic progress and an unresponsiveness to classroom situations. One is impressed by the rapidity with which he learns his tasks, and the quality and quantity of his performance. His excellent performance was shown clearly in the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test. J.G.'s effort, concentration, comprehension, recall, understanding and following directions were excellent. His coordination, especially around his hands and wrists, is extremely weak. J.G. lacks leadership; he is not enthusiastic and needs a great deal of motivation. He certainly underestimates his capabilities. Due to a slight speech defect, J.G. withdraws himself from most of the group.

CASE VI (C.A. 16-3; I.Q. 59)

D.H. is a quiet, passive, and a somewhat withdrawn youngster. He tries to isolate himself from others in the program due to a severe speech defect. Being difficult to communicate, he shies away from tasks that demand any verbal ability. D.H. would rather work alone; this is due to the fact of his markedly impaired speech, and not because he is socially incompatible. D.H.'s scores on the Hand and Tool Dexterity Test, the Minnesota

Rate of Manipulation Test, and the Purdue Pegboard Test were rated as very good, especially in effort and concentration. His comprehension, recall, understanding and following directions were fair. D.H. works at a slow, but steady pace, and his performance is good, both in quality and quantity. He is very cooperative and willing to help any one in need.

CASE VII (C.A. 13-3; I.Q. 55)

D.K. is an excitable, careless, moody, but generous youngster. His parrot-like actions cause D.K. many behavioral problems. He imitates his model to perfection, yet is unaware of doing so. Though D.K. has a slight speech defect, verbally he is high. He lacks perception and has a very short memory and attention span. His endurance and performance on a given task was rated poor. It was vividly seen in the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test, and the Purdue Pegboard Test that D.K.'s concentration, comprehension, recall, understanding and following directions were very poor. Due to the fact that D.K. is extremely distracted, he loses interest in a given task within minutes. He works hurriedly and without thinking of what he is doing just to get the task done. D.K.'s quality and quantity of performance were poor. D.K. lacks personal initiative and responsibility. D.K. needs constant supervision.

CASE VIII (C.A. 14-9; I.Q. 54)

J.S. is a somewhat frail, generous, cheerful but excitable youngster. He has a marked speech defect, nevertheless, this does not prevent him to speak out whenever he has the opportunity. Once a routine is set up for him, he works with little instruction. He is cooperative and willing to perform any task that is given to him. Socially J.S. gets along with his group, and relates well to his peers. On the Hand and Tool Dexterity Test, the Minnesota Rate of Manipulation Test and the Purdue Pegboard Test, J.S. rated very good. His comprehension, recall, understanding and following directions were good. J.S. has a good memory span, but is primarily limited to performance tasks with skills presented by visual techniques. J.S. needs realistic and meaningful planning if he is to succeed in manual training. His negative approach causes many behavioral problems.

#### Experimental Design

An experimental group was formed consisting of eight selected mentally retarded adolescent boys in the "A" and "B" non-academic secondary level, Saint Coletta School for Exceptional Children, Jefferson, Wisconsin. Five residential students living on campus, three living at home.

#### Experimental Projects

Woodworking projects were selected as the medium of

experience. The projects were programmed according to the subjects' level of development and achievement.

Three distinct woodworking projects were involved; (1) a marble game (basic project); (2) a shoe shine box (individual project); (3) a chest and seat (group project).

Subjects were assigned to work benches labelled work bench #1, work bench #2, work bench #3 and work bench #4. The subjects were not randomly assigned to their work benches, but in a specific order that would place a slow performer with a fast performer.

At each work bench basic tools, such as, a pencil, ruler, hammer, saw, screw driver and square were placed in order of sequence depending on the given task. Additional tools were added when needed.

Stock (wood materials) to be used to construct each project was placed on a long table labelled "stock and project bench". The names of the subjects were affixed to the stock and project bench, so that the subjects would have easy access to the stock needed for the construction of their specific project.

In the middle of the work shop, dividing the study areas from the work area, was placed a long desk labelled "students' desk during demonstration lesson". Each subject was assigned to a specific place at the study desk during prevocational training demonstration lessons.

At each study desk was placed a folder containing: (1) pictures of basic tools indicating the name of the tool, its

parts and its proper usage; <sup>1</sup> (2) a daily and weekly work and reward record sheet. The daily and weekly work and reward record sheet served to: (1) evaluate appropriate behavior; (2) reinforce appropriate behavior; (3) have before the subject his daily and weekly progress.

On the bulletin board, at the rear of the work shop, were placed a daily and weekly expectancy schedule. The schedule consisted of two record sheets labelled: (1) points you have earned this week, (2) what will you earn next week? These schedules were broken down to daily earnings. At the end of the week these earnings were added and recorded on the weekly <sup>2</sup> schedule.

#### Method

The projects were programmed by the investigator in accordance to the subjects' level of development and achievement. For the purpose of this study the following reinforcement technique was used:

At each desk were placed individual work folders containing basic assignments for the one hour regular shop class period in prevocational training, also a copy of the subjects' daily

1. Sample, Appendix B.
2. Sample, Appendix A.

and weekly work and reward record.

At the assigned time, 2:30 P.M., the door was opened and the subjects were permitted entry. During the first meeting the subjects were assigned to their specific places. Once at their assigned desks the investigator explained the procedure they would follow during the four weeks of the program.

Upon entry and without any directions from the investigator, the subjects immediately proceeded to the "apron closet", put on their aprons, rolled up their sleeves, went to the stock bench and got the stock needed for the construction of the first project, placed their stock at their assigned work bench, and proceeded to their assigned study desk. These steps indicated that the subjects were ready for work, and were immediately rewarded a penny, at which time the investigator marked their work and reward record with a diagonal sign (/). As the investigator gave the reward, he would ask one of the group, "do you know why you received a penny?" If the subject answered correctly, immediately the investigator would give him an additional penny, thus reinforcing the subjects to be alert the next day.

After rewarding the subjects for their readiness to work, the investigator immediately began his demonstration lesson.<sup>3</sup> The investigator was careful not to be garrulous and put more emphasis on demonstration. The demonstration lesson consisted of ten to fifteen minutes in woodworking skills. Each lesson taught involved the identification and proper usage of a specific tool or tools and shop safety. A prevocational demonstration

3. Sample. Appendix C.

lesson emphasized the tool or tools and woodworking skills to be used in constructing a given project.

Once the investigator finished the prevocational demonstration lesson, the subjects took their work assignment folders, and proceeded immediately to their work benches to begin working on a given project. At this time the investigator gave no further directions. In case of an individual needing help, the investigator went to his bench and again explained the procedure.

Primary emphasis was focused on: (1) comprehension; (2) recall; (3) understanding directions; (4) following directions; (5) classroom behavior; (6) cooperation; (7) safety conscious; (8) job completion.

The investigator immediately rewarded appropriate behavior as he marked the work sheet. Wrong tasks were not checked in any way on the record sheet; this served as a basis for individual teaching in order that the subject understand and perform appropriately.

At the end of the prevocational training class period, the subjects' work and reward record was reviewed and problems discussed. At this time the investigator would say, "you did just great today - but I am sure you can earn more tomorrow. How many points do you think you will be able to earn tomorrow?" At this time the investigator marked the subjects' expectancy schedule.

During the prevocational class period it was possible for the subject to earn nine pennies and additional pennies when correct answers to specific questions were given.

The above method was used by the investigator throughout each prevocational class period for the four weeks of the reinforcement program.



## CHAPTER III

### RESULTS

#### HYPOTHESIS TESTED

the present chapter deals with the results of testing the hypothesis relative to the present study, e.g., to determine if performance of a selected group of mentally retarded adolescent boys can be influenced by prevocational training utilizing a reinforcement technique.

The findings are presented in this chapter under the following headings: (1) description of subjects; (2) collective data of the four weeks of experiment; (3) comparison of the subjects' aspiration level and performance; (4) performance comparison of the eight subjects; (5) summary.

#### Description of Subjects

The subjects for the present study were eight mentally retarded adolescent boys I.Q. ranging between 50 - 76. Chronologically, they were between 13 - 3 and 16 - 3 years of age.

The eight mentally retarded subjects were enrolled at Saint Coletta School for Exceptional Children, Jefferson, Wisconsin, during the fiscal school year of 1968. Five of which were resident students and three day-hops living at home.

IQ-wise the subjects fall into the educable classification, Heber, 1961, but due to learning, maturation, performance and social adjustment, were assigned to a non-academic trainable class. Taking into account individual differences, the investigator felt they were ideal subjects for the present study.

#### Collective Data

The eight mentally retarded adolescent boys constructed the experimental projects under similar conditions: (1) a ten to fifteen minute prevocational demonstration lesson each day during the four weeks of experiment; (2) followed by a project-construction work period. At this time the investigator focused his attention on: (1) ready to work; (2) comprehension; (3) recall; (4) understanding direction; (5) following directions; (6) classroom behavior; (7) cooperation; (8) safety conscious; (9) assignment completed.

The following data was compiled from results of the subject's daily and weekly work and reward record, and the subject's aspiration level schedule.

CASE I

AA's aspiration level indicated the following scores:

- (1) first week, 20; (2) second week, 23; (3) third week, 34;  
(4) fourth week, 35.

AA's actual scores in performance were: (1) first week, 14 points; (2) second week, 15 points; (3) third week, 21 points; (4) fourth week, 16 points.

The above scores indicated success in the following:

- (1) ready to work; (2) classroom behavior; (3) cooperation.

CASE II

BB's aspiration level indicated the following scores:

- (1) first week, 32 points; (2) second week, 35 points; (3) third week, 35 points; (4) fourth week, 35 points.

BB's actual scores in performance were: (1) first week, 28 points; (2) second week, 29 points; (3) third week, 34 points; (4) fourth week, 34 points.

The above scores indicated success in the following:

- (1) ready to work; (2) comprehension; (3) understanding directions; (4) following directions; (5) classroom behavior; (6) cooperation; (7) safety conscious; (8) assignment completed.

CASE III

JB's aspiration level indicated the following scores:

- (1) first week, 34 points; (2) second week, 38 points; (3) third week, 40 points; (4) fourth week, 45 points.

JB's actual scores in performance were: (1) first week, 32 points; (2) second week, 36 points; (3) third week, 38 points; (4) fourth week, 45 points.

The above scores indicated success in the following: (1) ready to work; (2) comprehension; (3) recall; (4) understanding directions; (5) following directions; (6) classroom behavior; (7) cooperation; (8) safety conscious; (9) assignment completed.

#### CASE IV

DC's aspiration level indicated the following scores: (1) first week, 26 points; (2) second week, 37 points; (3) third week, 36 points; (4) fourth week, 28 points.

DC's actual scores in performance were: (1) first week, 18 points; (2) second week, 20 points; (3) third week, 18 points; (4) fourth week, 19 points.

The above scores indicated success in the following: (1) ready to work; (2) classroom behavior; (3) safety conscious.

#### CASE V

JG's aspiration level indicated the following scores: (1) first week, 24 points; (2) second week, 34 points; (3) third week, 35 points; (4) fourth week, 38 points.

JG's actual scores in performance were: (1) first week, 20 points; (2) second week, 28 points; (3) third week, 28 points; (4) fourth week, 36 points.

The above scores indicated success in the following:  
(1) ready to work; (2) comprehension; (3) recall; (4) understanding directions; (5) following directions; (6) classroom behavior; (7) safety conscious; (8) cooperation; (9) assignment completed.

#### CASE VI

DH's aspiration level indicated the following scores:  
(1) first week, 35 points; (2) second week, 38 points; (3) third week, 40 points; (4) fourth week, 36 points.

DH's actual scores in performance were: (1) first week, 32 points; (2) second week, 36 points; (3) third week, 36 points; (4) fourth week, 34 points.

The above scores indicated success in the following: (1) ready to work; (2) comprehension; (3) recall; (4) understanding directions; (5) following directions; (6) classroom behavior; (7) safety conscious; (8) assignment completed.

#### CASE VII

DK's aspiration level indicated the following scores:  
(1) first week, 20 points; (2) second week, 36 points; (3) third week, 34 points; (4) fourth week, 34 points.

DK's actual scores in performance were: (1) first week, 17 points; (2) second week, 34 points; (3) third week, 32 points; (4) fourth week, 33 points.

The above scores indicated success in the following:  
(1) ready to work; (2) comprehension; (3) recall; (4) under-

standing directions; (5) following directions; (6) classroom behavior; (7) cooperation; (8) assignment completed.

#### CASE VIII

JS's aspiration level indicated the following scores: (1) first week, 30 points; (2) second week, 41 points; (3) third week, 38 points; (4) fourth week, 34 points.

JS's actual scores in performance were: (1) first week, 20 points; (2) second week, 37 points; (3) third week, 36 points; (4) fourth week, 38 points.

The above scores indicated success in the following: (1) ready to work; (2) comprehension; (3) recall; (4) understanding directions; (5) following directions; (6) classroom behavior; (7) safety conscious; (8) assignment completed.

#### Comparison of the Subjects Aspiration Level and Actual Performance

On various occasions the investigator indicated that the results showed the subjects' aspiration level to be a significant factor influencing high success in performance, Chapter II and IV. Investigating the effect of aspiration level (goal setting) was not the purpose of this study, yet the investigator could not ignore its tremendous value and the important role this technique played in the overall picture of the investigation.

The investigator presents in Table I a comparison of the subjects' aspiration level and actual performance.

**TABLE I**  
**COMPARISON OF THE SUBJECTS' ASPIRATION LEVEL AND ACTUAL PERFORMANCE**  
**(FOUR WEEKS OF EXPERIMENT)**

Week of Experiment	Aspiration Level				Actual Performance			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Case I	20	23	34	35	14	15	21	16
Case II	32	35	35	35	28	29	34	34
Case III	34	38	40	45	32	36	38	45
Case IV	26	37	36	28	18	20	18	19
Case V	24	34	35	38	20	28	28	36
Case VI	35	38	40	36	32	36	36	34
Case VII	20	36	34	34	17	34	32	33
Case VIII	30	41	38	34	28	37	36	38

#### Performance Comparison of Subjects

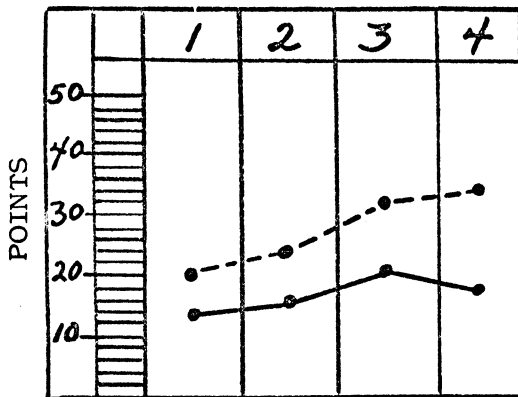
Results of the present study indicate that performance of a selected group of mentally retarded adolescent boys can be influenced by prevocational training utilizing a reinforcement technique.

In Figure I the investigator graphically presents a comparison of the mentally retarded subjects' actual performance scores, results of prevocational training and reinforcement. It is interesting to note how close the subjects' actual performance scores are to his expectancy (goal setting) scores.

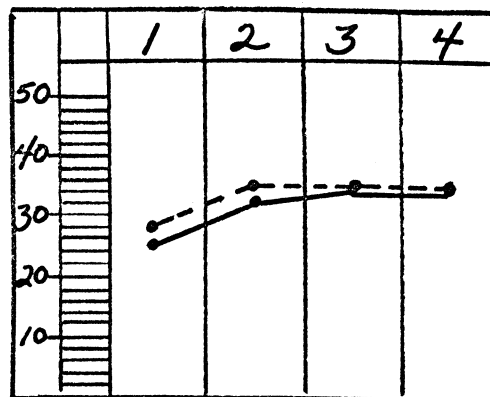


PERFORMANCE COMPARISON  
(four weeks of experiment)

WEEK

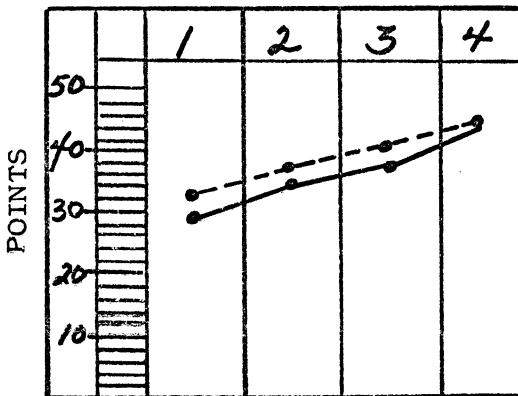


CASE I

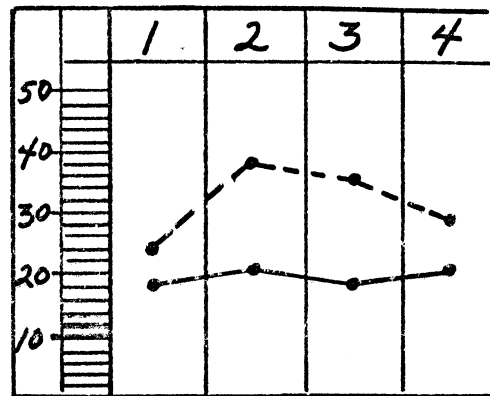


CASE II

WEEK

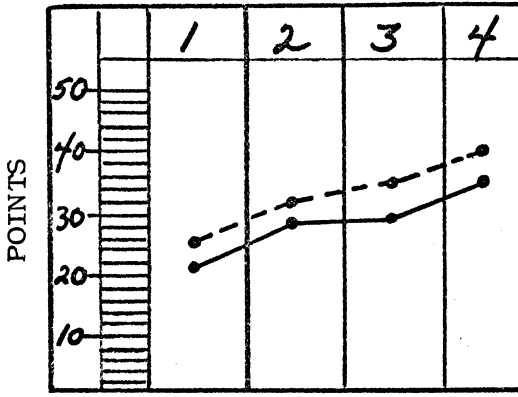


CASE III

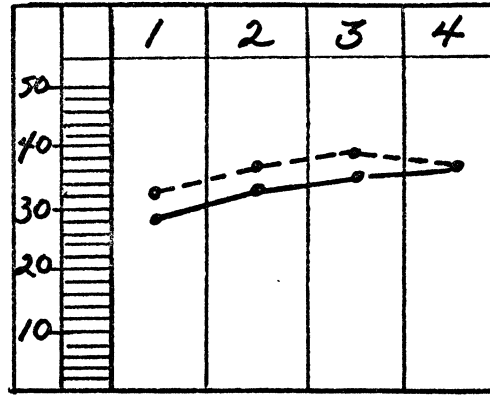


CASE IV

WEEK

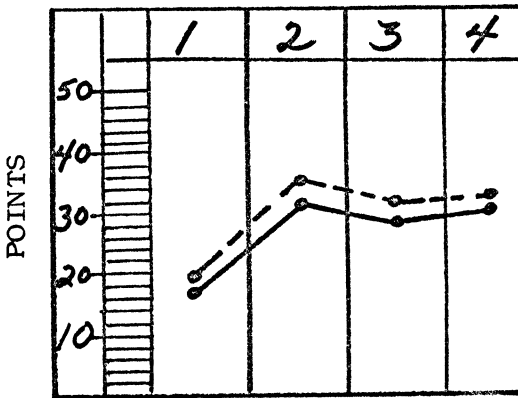


CASE V

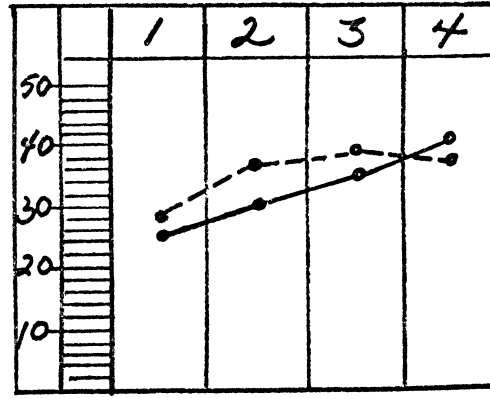


CASE VI

WEEK



CASE VII



CASE VIII

○ - - - ○ GOAL SETTING

○ - - - ○ PERFORMANCE

## SUMMARY

The present study points to three variable influencing performance of the eight selected mentally retarded adolescent boys: (1) prevocational training period utilizing a reinforcement technique; (2) subjects' daily and weekly aspiration level (goal sets); (3) imitation of a model (in the present study the investigator himself and one of the assigned working partners).

The investigator presents the following observations drawn from the graphs in Figure I.

1. Following a prevocational training period utilizing a reinforcement technique, there was a marked increase (high success) in performance in all cases except I and IV. The investigator cannot ignore the fact that there was in case I and IV a slight increase.

2. Six out of eight subjects were realistic in their goal setting. Figure I indicates how close performance scores are to aspiration scores. In case I and IV unrealistic goal sets are shown. The result of a realistic goal set indicated high success.

3. In the present study it was stated that the subjects were not randomly assigned working partners. The investigator saw it feasible to use an imitation technique, though this is not

the purpose of the present study throughout the four weeks of experiment. Imitation proved to be a significant factor influencing performance.

## CHAPTER IV

### RESULTS OF SPECIFIC RESEARCH QUESTIONS

This chapter presents the results of investigating specific research questions pertinent to the present study posed by the investigator.

1. Whether the investigator is able to study and delineate behavior characteristics related to performance of the selected mentally retarded adolescent boys?

In answer to this question the investigator employed observation, cumulative records and testing, such as, (1) Hand and Tool Dexterity; (2) Minnesota Rate of Manipulation; (3) Purdue Pegboard. These techniques resulted in the information which enabled the investigator to make the following observations.

(A week before the experimental program was put into effect, the eight selected mentally retarded adolescent boys were given the above tests under similar conditions.)

The investigator observed the following ratings on performance:

(1) none of the subjects rated excellent in effort; two rated good; two rated fair; and four rated poor.

- (2) none of the subjects rated excellent in comprehension; one rated good; four rated fair; and three rated poor.
- (3) none of the subjects rated excellent in recall; two rated good; two rated fair; and four rated poor.
- (4) none of the subjects rated excellent in understanding directions; two rated good; two rated fair; and four rated poor.
- (5) none of the subjects rated excellent in following directions; two rated good; one rated fair; and five rated poor.

These findings along with classroom observation and cumulative records indicate that the investigator is able to study and delineate behavior characteristics related to performance. It was from these findings that the investigator constructed the work and reward record sheet to study the effect of a prevocational training program on performance utilizing a reinforcement technique.

The investigator presents the above results of testing (Hand and Tool Dexterity; Minnesota Rate of Manipulation; and Purdue Pegboard) in Table 2.

TABLE 2

## RESULTS OF THE HAND AND TOOL DEXTERITY. MINNESOTA

## RATE OF MANIPULATION, PURDUE PEGBOARD TEST

Observable Characteristics	N	Excellent	Good	Fair	Poor
Effort	N	0	2	2	4
Comprehension	N	0	1	4	3
Recall	N	0	2	2	4
Understanding Directions	N	0	2	2	4
Following Directions	N	0	2	1	5

2. Whether behavior related to performance can be modified by prevocational training utilizing a reinforcement technique?

Evidence gathered in the course of four weeks of experience indicated that a reinforcement program enhances prevocational training. It was observed by the investigator that a reinforcement program not only modified student behavior, but teacher behavior, as well.

3. Whether prevocational training utilizing a reinforcement program influences performance of a selected group of mentally retarded adolescent boys?

Results (present investigation) indicate that performance of the selected mentally retarded adolescent boys was significantly effected by a prevocational training period. Performance of the selected subjects showed greater success on a given task when the subject received success during a prevocational training period (demonstration lesson). It was quite evident throughout the four weeks of experiment that the effect of high success during a prevocational training period resulted in high success in performance.

#### SUMMARY

The present study indicates that the investigator is able to study and delineate behavior characteristics of the selected mentally retarded adolescent boys; that behavior can be modified by prevocational training utilizing a reinforce-

ment technique; and that prevocational training significantly influences performance of the selected mentally retarded adolescent boys.



## CHAPTER V

### DISCUSSION AND SUMMARY

The purpose of the present study is not to indicate that a reinforcement technique represents a panacea in terms of managing and training mentally retarded adolescent boys. There is, however, ample research data to support the effect of reinforcement technique on performance. It does appear that reinforcement can permanently and effectively modify behavior.

The most important principle of operant conditioning is the principle of reinforcement. The principle refers to the observation that there are certain environmental events, commonly called reward, that an individual will work to produce. We influence others with these events when we reward behavior that we wish to make more frequent. These rewarding events are more technically referred to as reinforcers.

Most teachers have some system of classroom and pupil control which is intended to enhance effective performance. In most cases, an interested teacher with a flexible curriculum, well-organized lesson plans, and a realistic goal setting

system is sufficient to provide the structure, motivation-bolstering, and reward essential to success in performance. Of equal importance is the ability to define the pupil's educational needs; develop realistic goal sets; provide direction, training and guidance; and encourage gradual continued success through reinforcement technique of praise and reward.

In order for success in performance to occur, the pupil must be motivated to attend, concentrate and respond to stimuli. The pupil who is continually given work beyond his basic skills or ability seldom experiences success sufficient to motivate him to greater success. Obviously, a strong, well-organized system of rewards is essential.

Children can be taught appropriate responses through conditioning procedures which are sure to reinforce or reward the specific behavior desired. What is necessary is the development of a reinforcement program around the appropriate responses that have been clearly identified. Furthermore, to be effective, the technique must provide for immediate rewards to the single pupil when necessary, and must also encourage total classroom support.

On the basis of available studies, several simple principles have emerged which can and should be used in any prevocational training program interested in modifying student behavior and improve performance. These might be briefly summarized as follows:

1. Prevocational training lessons can be programmed

according to the student's level of development and achievement.

2. Materials to be learned can be systematically organized (programmed).

3. Desirable behavior should be immediately rewarded.

4. Rewards should be attainable after a reasonable amount of effort.

The investigator has attempted to utilize these concepts in a prevocational program.

The present study utilized a realistic workshop-class setting in which to investigate the effects of prevocational training utilizing a reinforcement technique on performance of eight selected mentally retarded adolescent boys.

The results indicated that performance is significantly effected by prevocational training utilizing a reinforcement technique on a series of experimental woodworking projects, such that prevocational training with high success results in better performance than does prevocational training with low success. With the eight selected mentally retarded adolescent boys, it was observed that performance following prevocational training with low success did not differ from that occurring when no prevocational training was given. Evidence gathered in the course of four weeks of experiment indicated that a reinforcement program is essential to prevocational training.

Pennies were used as positive reinforcers throughout the present study. When the subjects indicated they were ready for work, shirt sleeves rolled up, aprons on, stock

placed on their work-bench and seated at their assigned study-bench, the investigator marked their daily work and reward record, and immediately gave a penny to the subjects who were ready. The subjects who were not ready the investigator did not mark their record in any way, but just passed them by. In the process of rewarding the investigator would ask one of the subjects, "why are you receiving this penny?" If the subject answered correctly, he immediately would receive another penny. This served to stimulate the non-ready subjects to get up and prepare their stock. After a few days of such a procedure it was observed that all subjects were receiving a penny for their appropriate behavior of readiness to work, a reward which was easily attained without too much effort. A first success was very important to the subjects. Not experiencing failure, which they had been accustomed to, bolstered their motivation to perform better, thus stimulating them to work for the next reward.

The investigator observed that the subjects with distractibility, inattentiveness, hyperactivity, and lack of self-control were greatly effected by a reinforcement technique. Certainly, social tolerance is basic to the operation of any reinforcement system. As long as the child is a part of the class, he is a member of a social system that can be managed to control his behavior. A noticeable change in behavior was observed in cases II, III, IV and VII, Chapter II.

Daily programmed demonstration lessons are essential to the success of a prevocational training program. It was clearly indicated during the four weeks of experiment, that the success

in performance of the eight selected mentally retarded adolescent boys was due to the investigator's daily programmed demonstration lessons, Appendix B and C. Demonstration lessons must be programmed to the subject's level of development and achievement. A step-by-step demonstration lesson must be taught before actual construction of a project is begun. The subject's success in performance is the result of a step-by-step demonstration lesson. If the subject is unable to understand the lesson and procedures to follow, he will experience failure, thus, adding another to his long list of failures. It is important that the teacher so program his lessons to assure success. He must use every possible means, such as, audio-visual aids, bulletin board displays, picture plans of construction, even be a ham actor if the need arises. Only when the teacher has exhausted all the possible means can he conclude that the subject's performance is a success or failure.

One of the influencing variables effecting performance is the subject's expectancy level (goal setting). Though it wasn't the purpose of this investigation to study the effect of goal setting on performance, the investigator could not ignore this technique and its effect on the eight selected mentally retarded adolescent boys. Each day after the demonstration lesson was given, the investigator asked each subject, "Yesterday you earned (so many pennies), that was great! Today I am sure you can earn more. How many pennies will you earn today?" The subject's expectancy scores were immediately

recorded on an expectancy level chart placed on the bulletin board in constant view of the subject. A record of all scores were kept, expectancy scores and actual performance scores. A daily and weekly comparison was made, Chapter III, Table 1; Chapter III, Figure 1. The present study indicated that goal setting was a significant variable influencing the performance of the subjects. Subjects who tended to be realistic in their goal setting experienced success. Subjects who tended to be unrealistic in their goal setting did not achieve success. It was observed that this was the first step to self-realization.

As educators we tend to underestimate the potential of a retarded child, tend to determine for him a low expectancy level. If we set high goals for the mentally retarded, he will, with proper programmed lessons and reinforcement techniques, achieve high goals. Success is determined by realistic goal setting.

Retarded children are capable of imitation. For the purpose of this study, the investigator himself and appointed partners (subjects) were models for the slow performers. It was indicated during the four weeks of experiment, that success in performance was related in part to the partner in the given task.

## Summary

The purpose of the present study was to investigate the effect of prevocational training utilizing a reinforcement technique on performance of eight selected mentally retarded adolescent boys.

Expectancy and imitation techniques were two variables that could not be ignored in the overall picture of the present study.

The eight selected mentally retarded adolescent boys were given programmed daily prevocational training lessons, Appendix A and B, under similar conditions. Each subject following a prevocational training lesson was required, during the four weeks of experiment, to construct three experimental woodworking projects. Projects were designed by the investigator in accordance with the subjects' level of development and achievement: (1) basic project (Appendix C); (2) individual project (Appendix C); (3) group project (Appendix C).

Pennies were utilized as reinforcers during the four weeks of experiment. As the subject demonstrated appropriate behavior the investigator immediately rewarded him with a penny, thus stimulating the subject to the next step in performance.

Results indicate that a prevocational training program, utilizing a reinforcement technique, significantly influence

the performance of the eight selected mentally retarded adolescent boys; that a reinforcement technique is a positive factor in a prevocational training program. Both expectancy (goal setting) and imitation (model) proved to be significant variables influencing performance.

It was indicated that six of the subjects were significantly effected by the present program. The investigator observed a change in perception which altered behavior. Two of the subjects were not significantly effected by the present program. Yet, in light of the time factor, one cannot conclude failure. It would be very interesting to observe the outcome of such a program if the time had been extended?

The investigator is unable to relate all his classroom observations; this would be beyond the scope of the present investigation. However, one factor must be underlined, that such a program did not only modify student-behavior, but teacher (investigator)-behavior as well.

Through such a reinforcement technique, mentally retarded children begin to experience success. The success experienced by the eight mentally retarded adolescent boys is indicative of the influence of prevocational training utilizing a reinforcement technique on performance.

Experimental programs utilizing a reinforcement technique should be devised and applied in classes for exceptional children to elicit success in performance. Teachers must build the retardate's success potential; only then can success itself be utilized as a motive for SELF-STRIVING.



## APPENDICES

APPENDIX: A

(Record Sheet Sample)

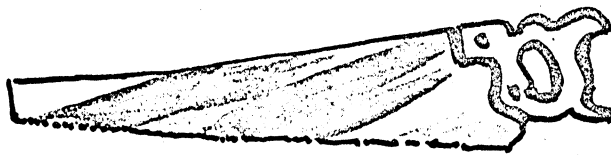
DAILY AND WEEKLY WORK AND REWARD RECORD					
SUBJECT'S NAME: _____			PROJECT: _____		
CLASS: _____			DATE: _____		
ASSIGNMENTS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1. <u>READY TO WORK</u> (aprons on; sleeves rolled up; etc.)					
2. <u>COMPREHENSION</u> (proper use and care of tools)					
3. <u>RECALL</u>					
4. <u>UNDERSTANDING DIRECTIONS</u>					
5. <u>FOLLOWING DIRECTIONS</u>					
6. <u>CLASSROOM BEHAVIOR</u>					
7. <u>COOPERATION</u>					
8. <u>SAFETY CONSCIOUS</u>					
9. <u>ASSIGNMENT COMPLETED</u>					
DAILY POINTS					
WEEKLY POINTS					

Teacher's Signature: \_\_\_\_\_

CHARTS USED

(Tools and Procedures)

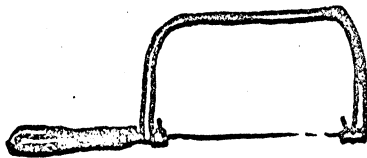
# TOOLS YOU WILL NEED



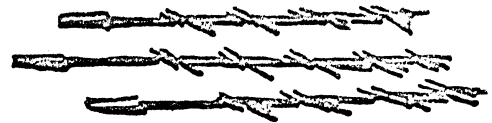
HAND SAW



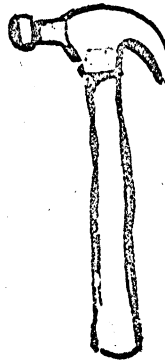
BIT BRACE



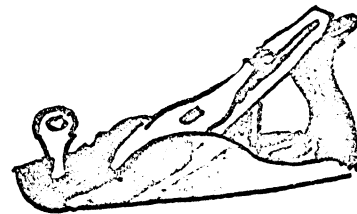
COPING SAW



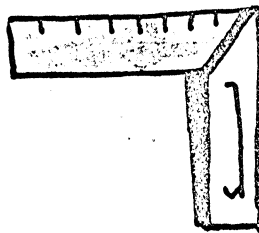
BITS



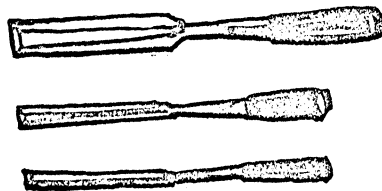
HAMMER



PLANE



TRY and MITRE SQUARE



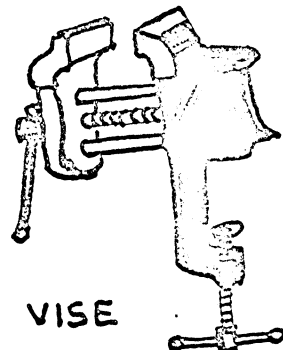
CHISELS



SCREW DRIVER



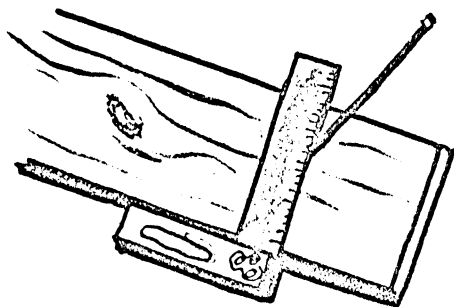
PLIERS



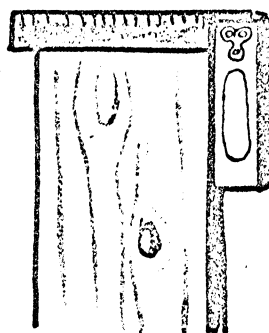
WISE

TO THESE TOOLS MAY BE ADDED A PENCIL, A RULER and ASSORTED SANDPAPER also OTHER TOOLS AS YOU NEED THEM.

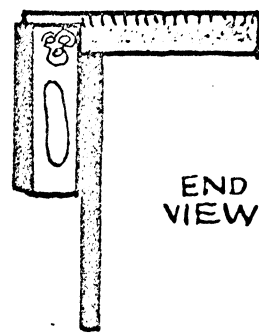
# THE TRY SQUARE *and* RULER



DRAWING A LINE *with* A TRY SQUARE, A SHARP KNIFE OR PENCIL MAY BE USED.

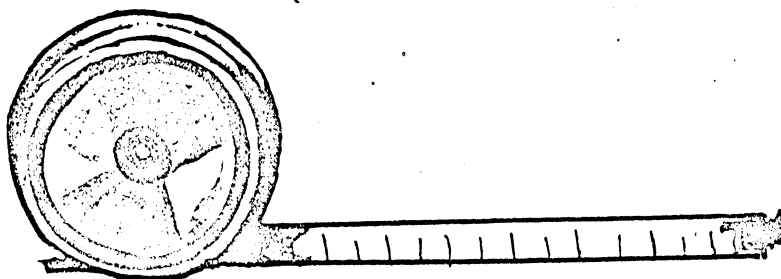


FRONT VIEW

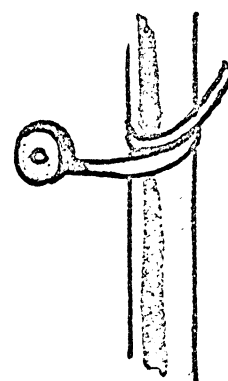


END VIEW

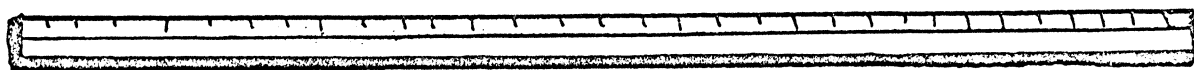
USING A TRY SQUARE TO TEST FOR SQUARE EDGES. NO LIGHT SHOULD COME THROUGH WHERE BLADE MEETS WOOD.



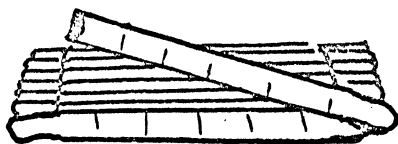
THE PUSH-PULL RULE IS A FLEXIBLE STEEL TAPE THAT CAN BE USED TO MEASURE BENT SURFACES.



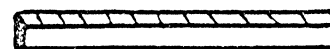
MEASURING A PIPE.



THE YARD RULE IS USED FOR MEASURING LONG PLANKS.

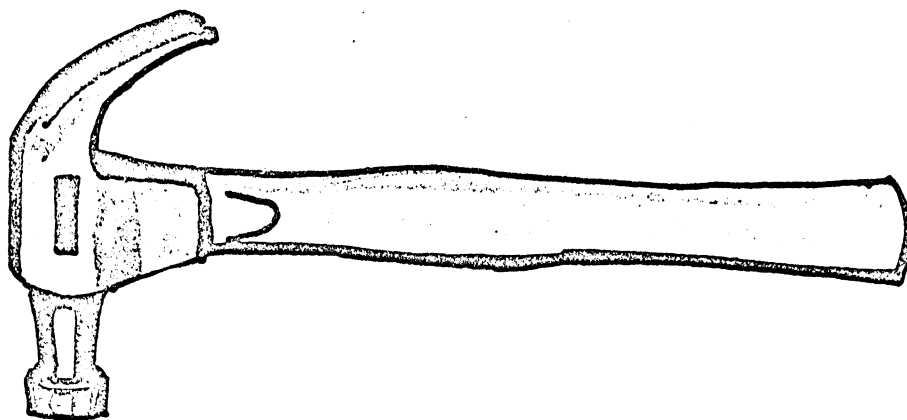


FOLDING RULE

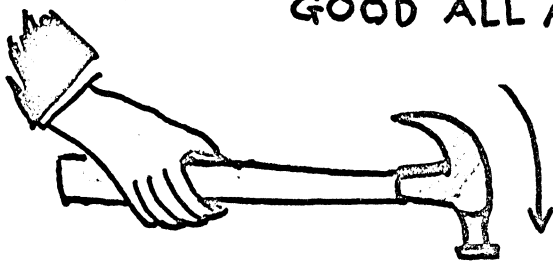


FOOT RULE

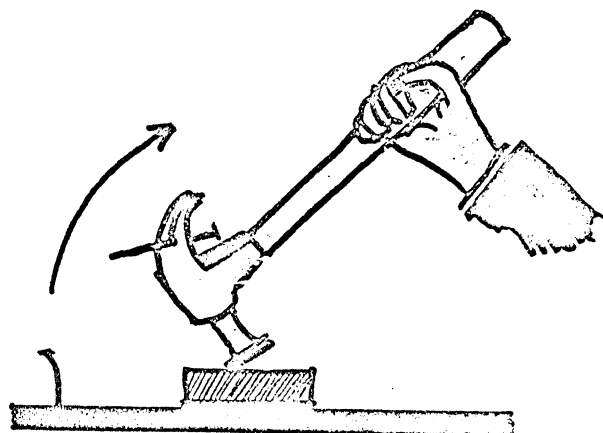
# THE HAMMER



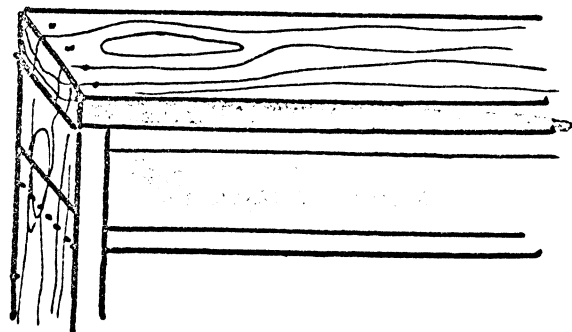
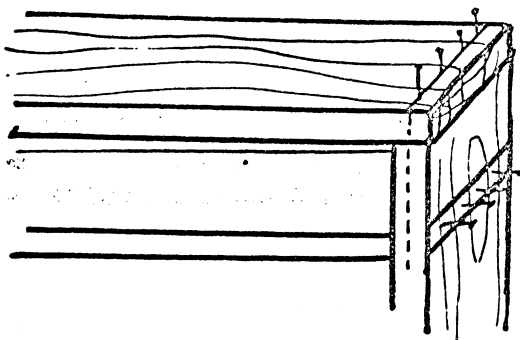
THERE ARE TWO PARTS TO THE HAMMER. THE HEAD FOR DRIVING NAILS *and* THE CLAW FOR PULLING NAILS. TRY TO USE A HAMMER THAT BALANCES EASILY. A 16 OUNCE HAMMER IS A GOOD ALL AROUND TOOL.



GRASP HAMMER FIRMLY *at* LOWER END OF HANDLE

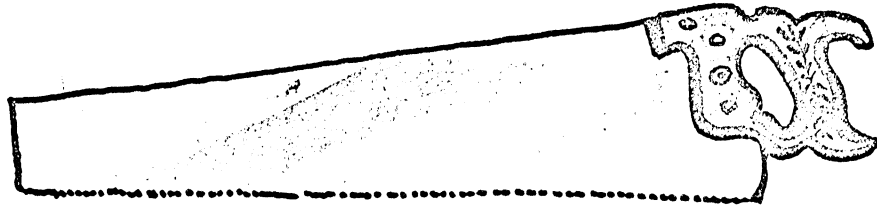


REMOVE NAIL *by* PULLING HAMMER TOWARDS YOU

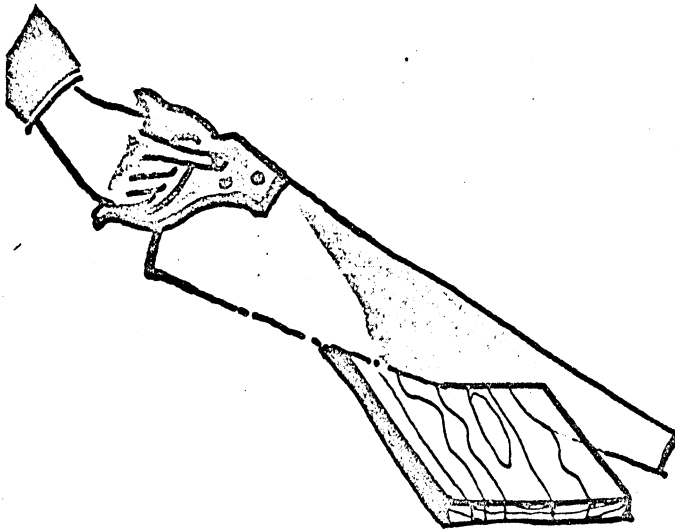


Mark lines with pencil where nails are to be set.

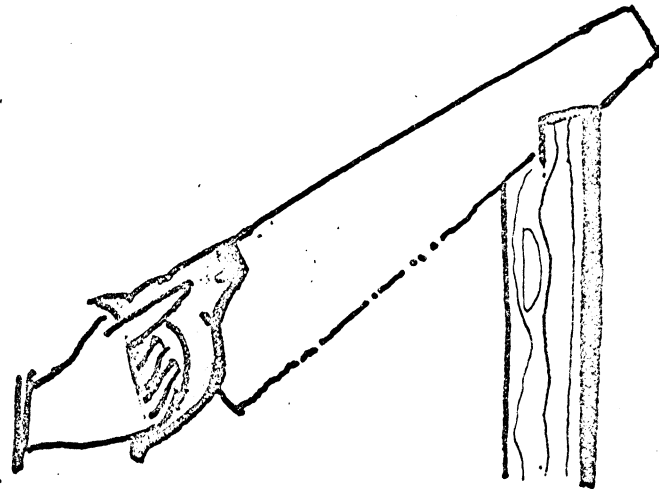
# THE SAW



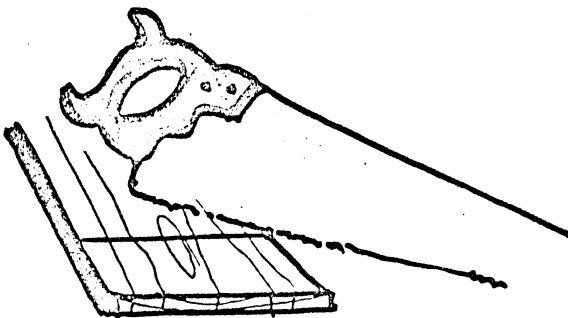
THE CROSSCUT SAW IS THE MOST COMMONLY USED SAW IN THE TOOL CABINET. AS ITS NAME IMPLIES, IT IS USED TO SAW AGAINST THE GRAIN OF THE WOOD. IT MAY ALSO BE USED TO SAW WITH THE GRAIN. IT IS BETTER TO USE A RIPSAW FOR THIS PURPOSE.



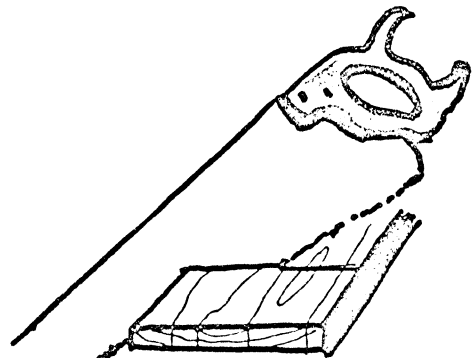
CUTTING AGAINST THE GRAIN



CUTTING WITH THE GRAIN



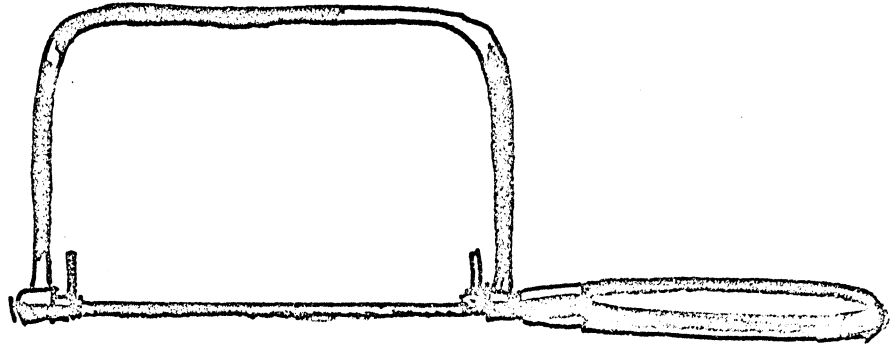
TO START SAWING DRAW SAW BACK SEVERAL TIMES TO MAKE A GROOVE



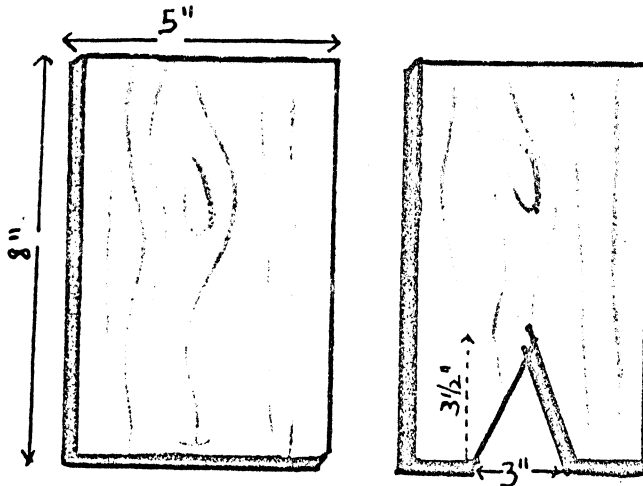
SAW ALONGSIDE OF PENCIL MARK WITH AN EASY BACK and FORTH MOVEMENT

THE NUMBER OF TEETH TO AN INCH IS STAMPED ON THE SAW BLADE. #8 IS A GOOD ALL AROUND SAW

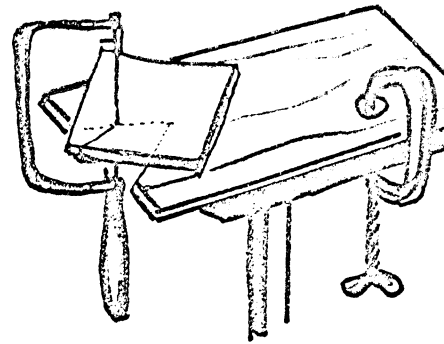
# THE COPING SAW



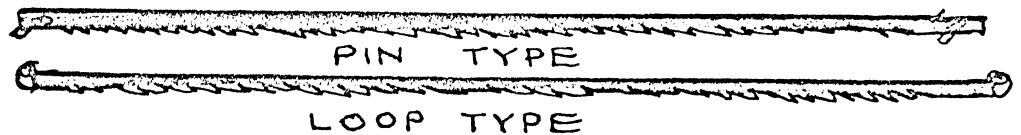
THE COPING SAW IS USED FOR CUTTING MANY SHAPES. IT ALSO CUTS CURVES AND CIRCLES. THE BLADE IS SET IN THE FRAME SO THAT THE TEETH POINT TOWARD THE HANDLE.



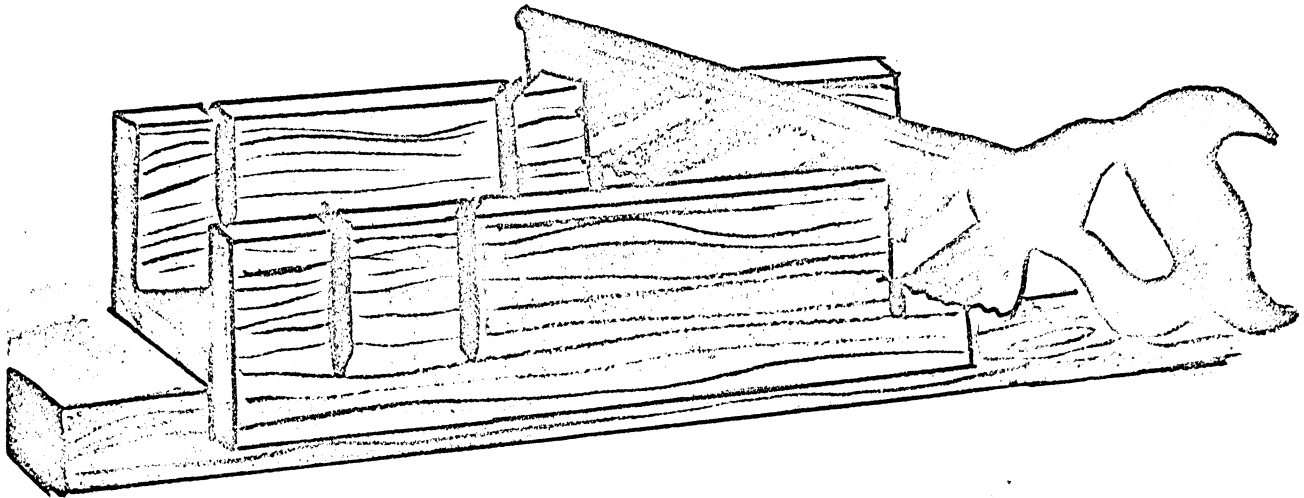
A CUTTING BOARD FOR THE COPING SAW. CUT A "V" 3" WIDE and  $3\frac{1}{2}$ " DEEP.



CLAMP CUTTING BOARD TO TABLE. SAW WITH UP AND DOWN MOTION.

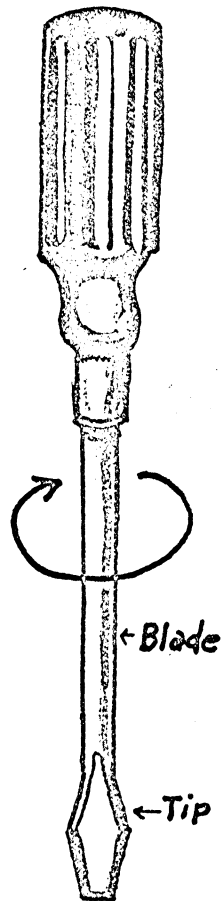


COPING SAW BLADES COME IN BOTH TYPES. THE BLADES ARE  $6\frac{1}{2}$ " LONG. THE PIN TYPE IS BEST BECAUSE IT WILL NOT COME OUT OF THE FRAME.



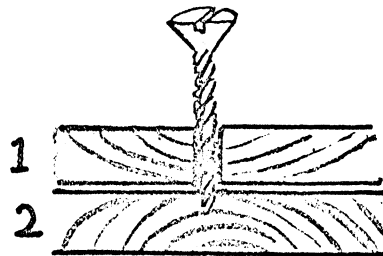
THE MITRE BOX IS USED FOR CUTTING ANGLES FOR PICTURE FRAME MOULDINGS AND WHEREVER ACCURATE CUTTING IS NEEDED. CUTS MITRES RIGHT OR LEFT AND RIGHT ANGLES.

## THE SCREW DRIVER



TURN SCREW DRIVER  
CLOCKWISE.

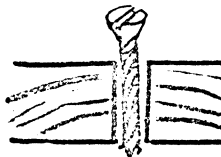
SCREW DRIVERS VARY IN SIZE FROM A SMALL JEWELERS TOOL TO A HEAVY DUTY SCREW DRIVER. BLADES AND TIPS VARY IN SIZE.



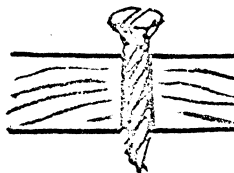
### HOW TO SCREW

DRILL A HOLE THROUGH 1. INSERT SCREW and WITH SCREW DRIVER, DRIVE SCREW DOWN THROUGH 2.

THE SCREW SHOULD BE LONG ENOUGH TO GO THROUGH BOTH PIECES OF WOOD.



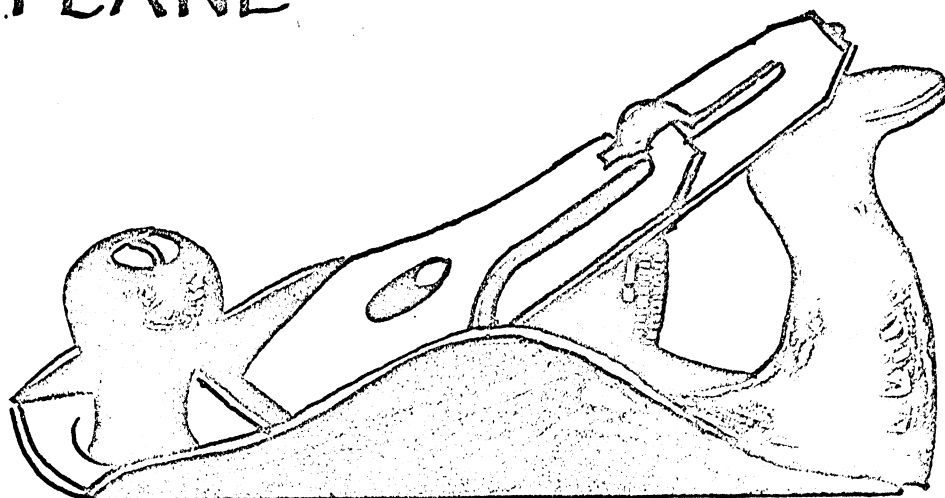
HOLE IS TOO  
LARGE.



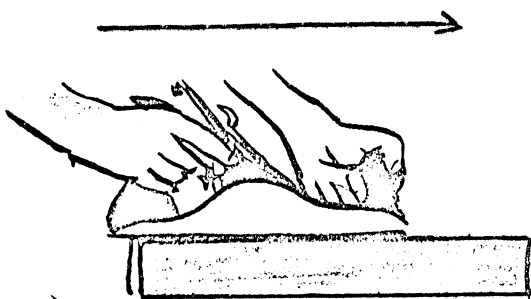
SCREW FITS  
CORRECTLY



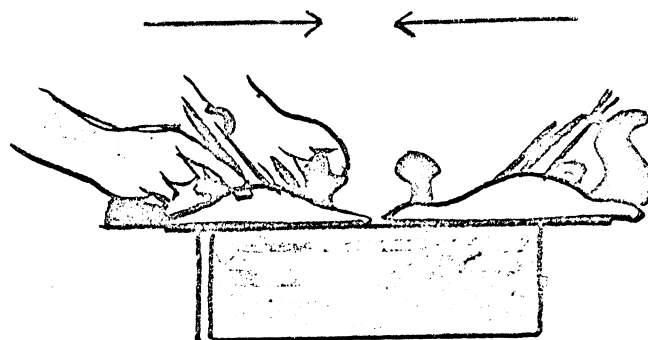
# THE PLANE



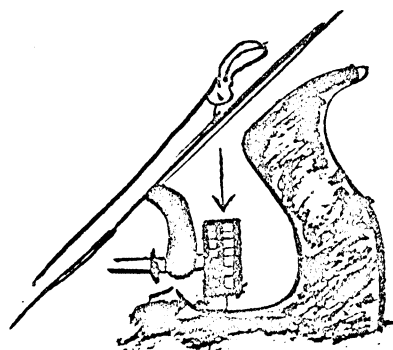
THE PLANE WAS ORIGINALLY A CHISEL SET IN A BLOCK OF WOOD. THE SMOOTH PLANE IS USED FOR PLANING LARGE SURFACES. IT IS ALSO USED IN PLANING EDGES AND ENDS OF WOOD.



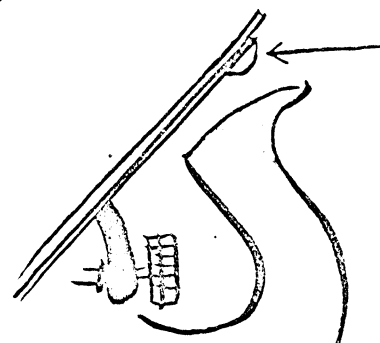
PLANING WITH THE GRAIN. PRESS ON KNOB AT START OF STROKE. PRESS ON HANDLE AT THE END OF STROKE.



PLANING AGAINST THE GRAIN. PLANE HALF WAY TOWARDS THE CENTER. THEN PLANE HALF WAY FROM OTHER END TOWARDS THE CENTER.



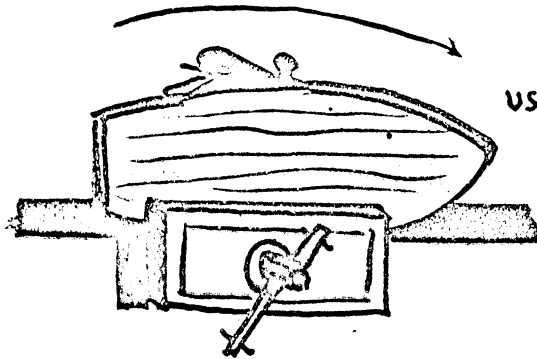
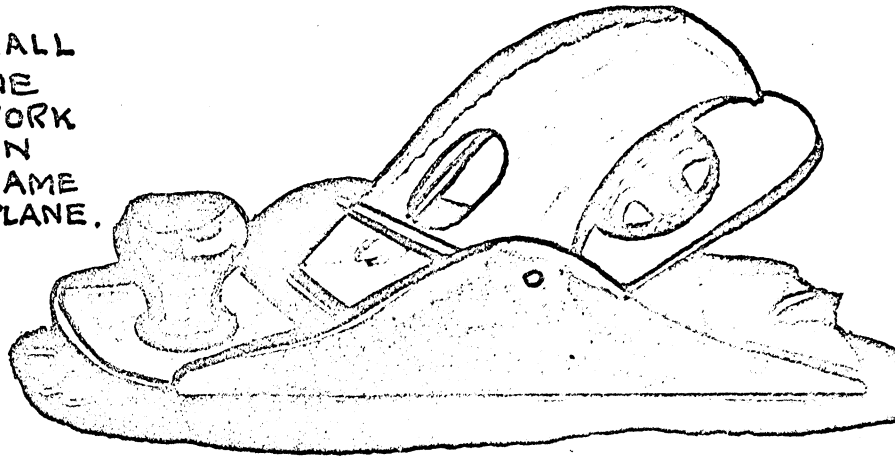
THE ADJUSTING NUT REGULATES THE THICKNESS OF SHAVING MADE BY THE PLANE BLADE.



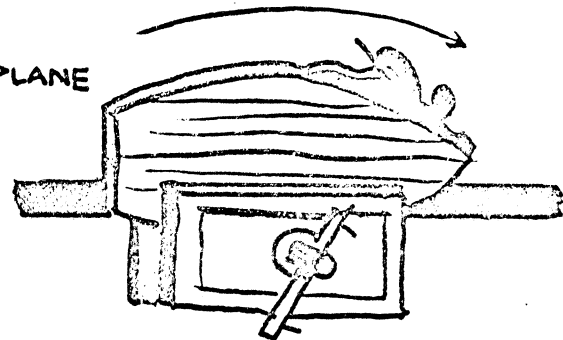
THE ADJUSTING LEVER MOVES THE BLADE SO THAT IT CUTS EVEN SHAYINGS.

# THE BLOCK PLANE

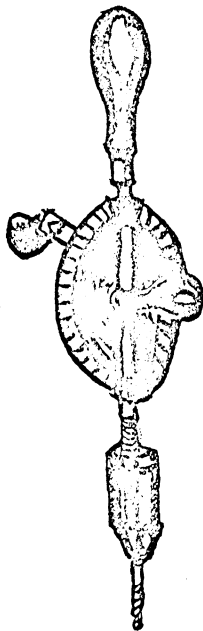
THE BLOCK PLANE IS SMALL ENOUGH TO USE WITH ONE HAND WHILE HOLDING WORK WITH THE OTHER. IT CAN ALSO BE USED IN THE SAME MANNER AS THE BENCH PLANE.



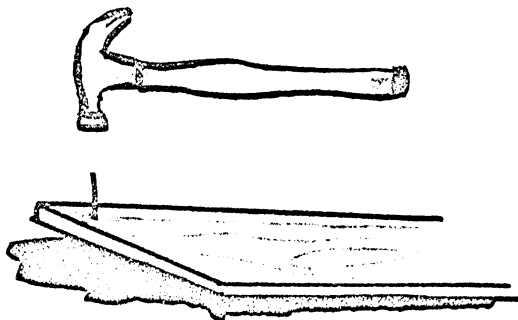
USING THE BLOCK PLANE



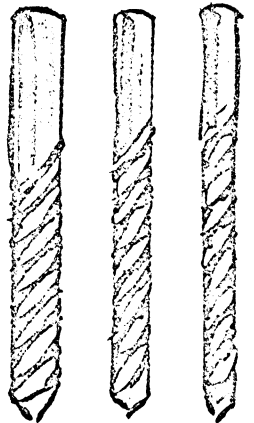
# THE HAND DRILL



THE HAND DRILL IS USED FOR DRILLING SMALL HOLES IN WOOD

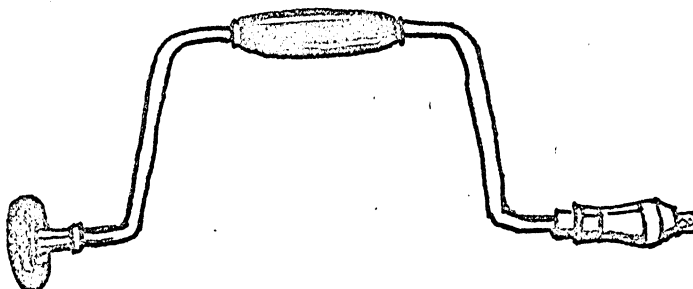


MARK HOLE WITH NAIL BEFORE STARTING TO DRILL



TWIST BITS FOR HAND DRILL

# THE BRACE and BIT



THE BRACE IS USED FOR GENERAL DRILLING PURPOSES. IT CAN HOLD VARIOUS BITS SUCH AS THE AUGER BIT AND COUNTERSINK BIT.

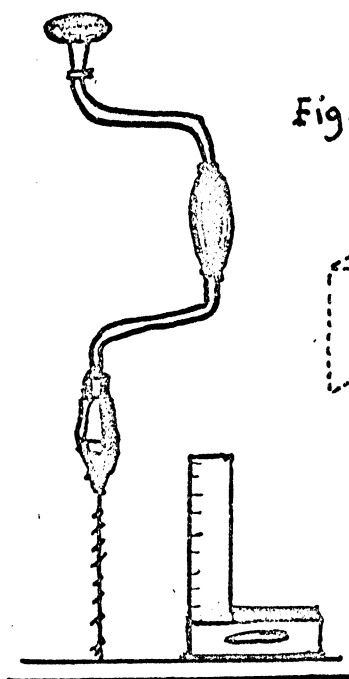


Fig. 1

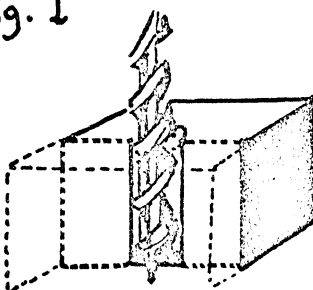


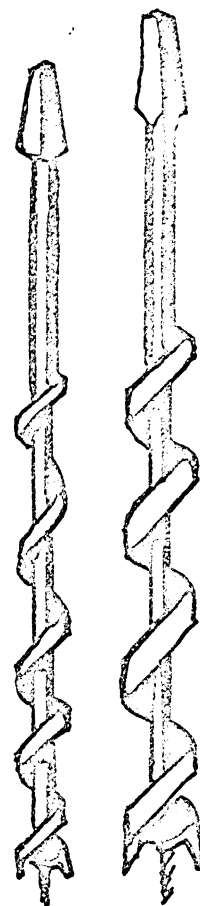
Fig. 2

TO PREVENT SPLINTERING WHEN BORING WITH THE BRACE and BIT, DRILL THROUGH WOOD UNTIL THE SPUR COMES THROUGH OTHER END. Fig. 1.

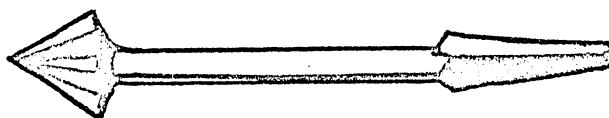
REVERSE WOOD AND DRILL. Fig. 2.

THE TRY SQUARE HELD IN LINE WITH THE BRACE and BIT HELPS TO KEEP THE BRACE FROM WOBBLING.

AUGER BITS COME IN SIZES FROM  $\frac{3}{16}$ " TO  $\frac{1}{2}$ ". THE SIZE IS STAMPED ON THE HEAD.



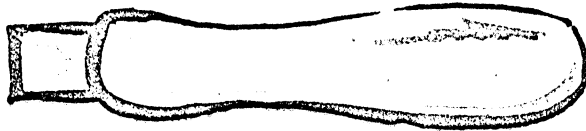
AUGER BITS



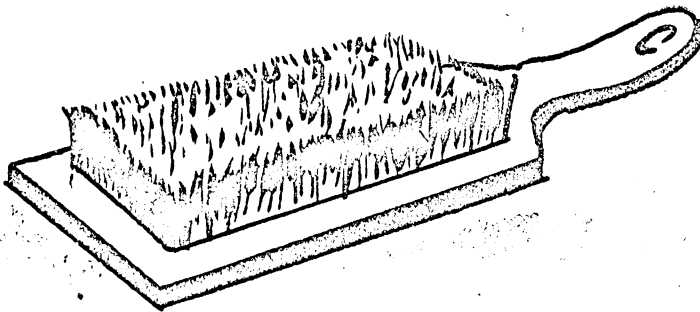
AFTER THE SCREW HOLE HAS BEEN DRILLED IN THE WOOD, THE COUNTERSINK BIT WILL SPREAD A HOLE WIDE ENOUGH TO TAKE THE SCREW HEAD.

# FILES

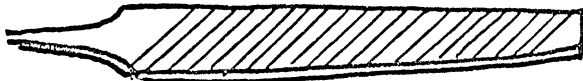
FILES ARE USED FOR SMOOTHING WOOD. THERE ARE MANY KINDS OF FILES. THEY COME IN VARIOUS SIZES AND CUTS.



FILE HANDLE



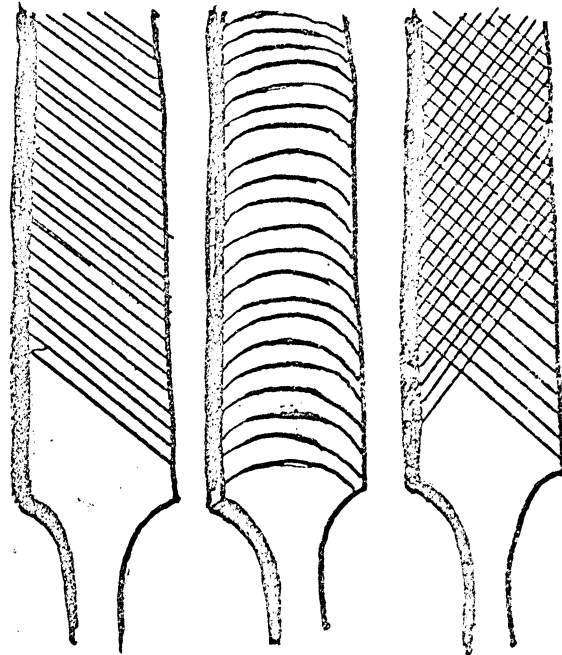
FILE CARDS ARE USED TO CLEAN FILES WHEN THEY ARE CLOGGED BY SAWDUST



The flat file is used for flat work.



The half round file is used for round and flat work.



SINGLE CUT

CURVED CUT

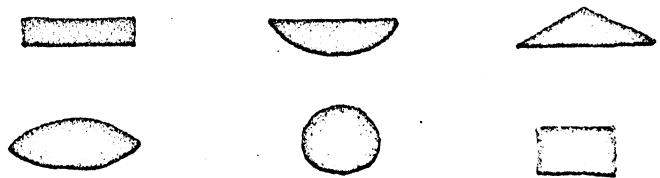
DOUBLE CUT

FILES ARE DESIGNATED BY LENGTH SHAPE and CUT.



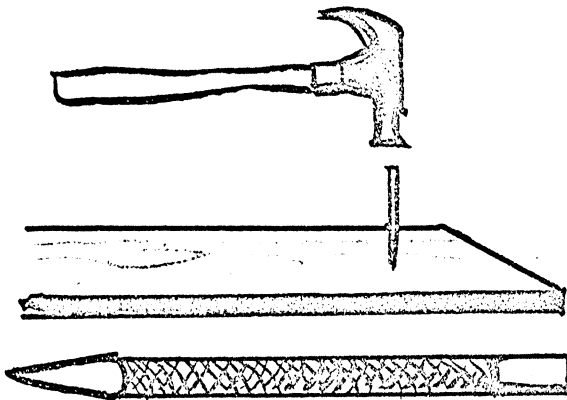
THE RASP HAS TEETH THAT CUT WOOD DOWN QUICKLY.

SMOOTH FILES ARE USED TO FINISH FINE WORK.

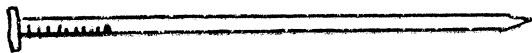


CROSS SECTION OF VARIOUS FILE SHAPES.

# MISCELLANEOUS TOOLS



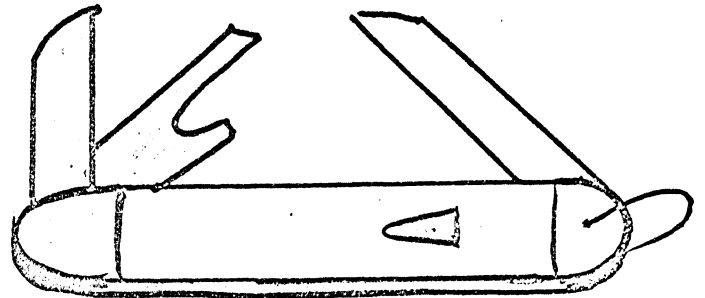
THE NAIL SET IS USED TO SINK THE HEADS OF BRADS BELOW THE SURFACE OF THE WOOD.



A LONG NAIL MAY BE USED AS A NAIL SET.

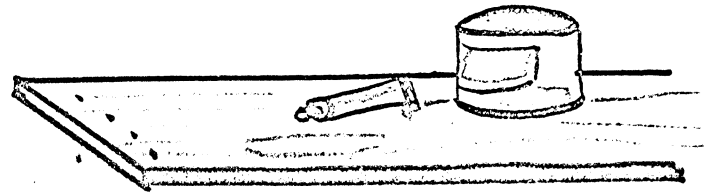


FISH GLUE IS A GOOD WOOD GLUE.



THE POCKET KNIFE IS AN IMPORTANT TOOL FOR THE CRAFTSMAN. IT SHOULD BE KEPT SHARP.

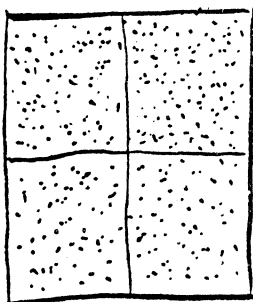
WHEN WHITTLING WOOD ALWAYS KEEP YOUR WORK AND KNIFE AWAY FROM YOU.



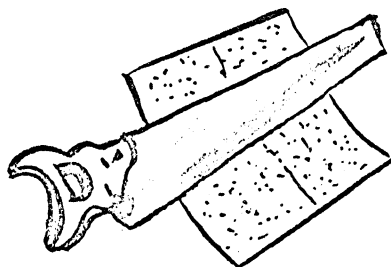
USE PUTTY OR PLASTIC WOOD TO FILL HOLES OR CRACKS IN WOOD.

## HOW TO SANDPAPER

SANDPAPER IS AN IMPORTANT TOOL IN THE SHOP. IT MAY BE PURCHASED IN PACKAGES OF ASSORTED TEXTURES OR IN LARGE SHEETS. ORDER BY NUMBER—No. 00—very fine, No. 0—fine, No. 1/2—medium fine, No. 1—medium coarse.



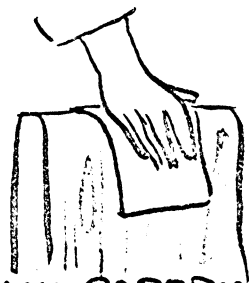
FOLD SANDPAPER



CUT ALONG EDGE OF SAW



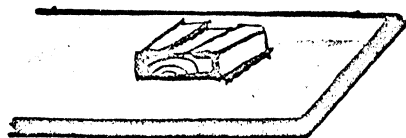
FOR FLAT SURFACES



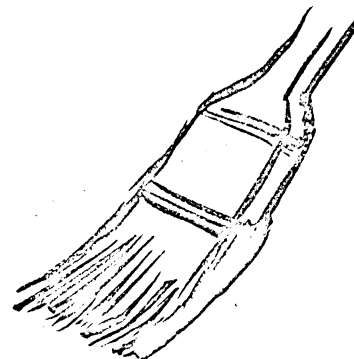
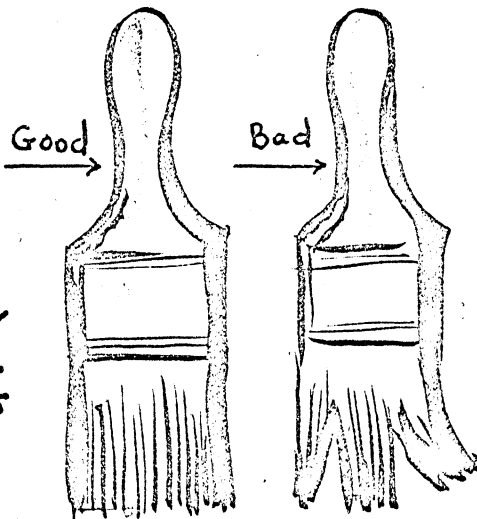
SANDPAPERING A ROUND SURFACE

# PAINING, STAINING and FINISHING

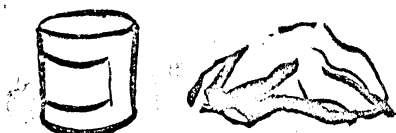
BEFORE STARTING TO PAINT OR STAIN, MAKE CERTAIN THAT ALL SCRATCHES, SPOTS, ETC., ARE REMOVED BY A THOROUGH SANDPAPERING. ALWAYS SANDPAPER WITH THE GRAIN TO AVOID SCRATCHING THE SURFACE.



USE MEDIUM SAND-PAPER, FOLLOWED BY SMOOTH SANDPAPER. SHELLAC ALL KNOTS BEFORE PAINTING.



CLEAN BRUSH WITH TURPENTINE. WASH BRUSH WITH SOAP AND WATER.



OILSTAIN RAG

**STAINING**  
BRUSH OILSTAIN ON WITH FULL BRUSH. AFTER 20 MINUTES RUB OFF WITH RAG FOR DESIRED TONE.

USE A 2" BRUSH FOR MEDIUM SIZED WORK.

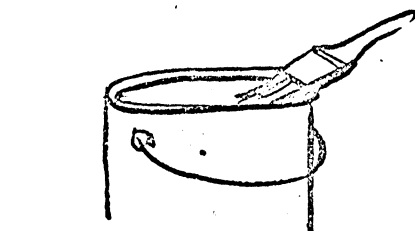
## PAINING

USE A GOOD GRADE ENAMEL. FIRST COAT SHOULD BE THINNED WITH TURPENTINE. FINAL COAT OF PAINT IS PUT ON AS IT COMES OUT OF THE CAN.

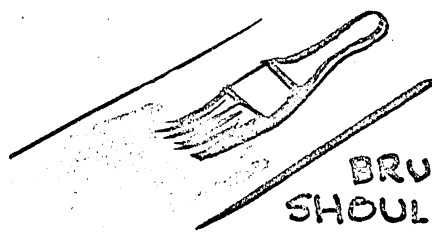


PASTE WAX RAG

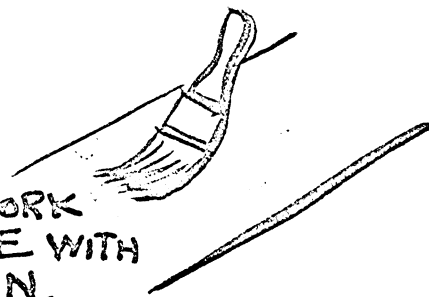
**WAXING**  
A COAT OF WAX ON A STAINED SURFACE HELPS TO PRESERVE THE FINISH. RUB AFTER 20 MINUTES.



WIPE BRUSH ALONG EDGE OF CAN.



BRUSHWORK SHOULD BE WITH THE GRAIN.



## APPENDIX C

**Samples of Prevocational Demonstration Lessons**

For the purpose of the present study the following lessons were programmed by the investigator, and used during the prevocation demonstration period; one hour per day for four weeks.

The development of skill comes through repetition of processes involved in projects done in the course of an allotted class period. These projects should arise from the interests and experiences of the pupil. They should appeal to him because of their utility or other qualities. Standard workmanship should be in harmony with the achievement to be expected of pupils within a given level. Standards should also be related to individual capacity. For the purpose of the present study a standard of workmanship was set up by the investigator in harmony with the achievement of the eight selected mentally retarded adolescent boys who were assigned to the A and B non-academic trainable level.

During the actual construction of projects a demonstration of processes and the use and care of tools in conformance with accepted industrial practice was given as often as necessary.

The following types of projects were used throughout the present investigation:

- (1) basic project ( marble game )
- (2) individual project ( shoe shine box )
- (3) group project ( seat and book chest )

#### Definition of Terms

##### BASIC PROJECT

A basic project is one that is undertaken at the beginning of a course to develop some measure of skill in the use of fundamental tools and in fundamental processes.

For the purpose of the present study the mentally retarded subjects worked on a basic project at the same time and under the same conditions. The project was limited in scope so that the subjects were able to have it completed within a weeks time.

##### INDIVIDUAL PROJECT

An individual project may be of the pupil's own choice, or may be suggested by the teacher.

For the purpose of the present study the individual project incorporated the elements found in constructing the basic project, plus the use of other tools and processes which required demonstration by the investigator.

##### GROUP PROJECT

A group project is one that requires the combined activity of two or more pupils. It is valuable in that it fosters such traits as leadership, cooperation and respect for the activity of others.



The group project constructed during this investigation, pleasure of the subjects, was donated to Sister Justa, the School Principal. Such bolstering motivation cannot be ignored in a classroom setting.

#### Lesson Plan Used in the Present Study

- I - AIM:  
Topic to be covered.
- II - INVESTIGATOR'S PREPARATION:  
Tools, materials, models, visual aids.
- III - PREPARATION OF THE SUBJECTS:  
Questions on real life situations, general knowledge or hobbies.
- IV - DEMONSTRATION:  
Demonstration by the investigator. Emphasis on difficult elements of the process. Trials by typical pupils to assure understanding and ability to do the operation.
- V - SAFETY:  
Emphasis on safety in "shop-class".
- VI - SUMMARY:  
Review of the sequence of component steps.  
Questions to bring out the highlights of the lesson.
- VII - APPLICATION:  
Application of the process to the project being constructed. Alertness on the part of the

investigator to give assistance and determine the need for redemonstration.

#### Projects Used in the Present Study

After a cursive survey of literature found in POPULAR MECHANICS, FLYING CHIP, FUNDAMENTALS OF WOODWORKING, EASY WOODWORKING PROJECTS FOR BOYS, and various HOME AND GARDEN magazines, the following projects were selected by the subjects themselves.

- ( 1 ) BASIC PROJECT - The marble game
- ( 2 ) INDIVIDUAL PROJECT - The shoe shine box
- ( 3 ) GROUP PROJECT - Chest and Seat

#### Actual Lessons Used in the Present Study

#### I - BASIC PROJECT

##### THE MARBLE GAME

##### DEMONSTRATION LESSON PLAN I

##### AIM:

To teach pupils how to prepare the working edge.

##### INVESTIGATOR'S PREPARATION:

Have on hand - -

Piece of stock  $3/4$ " x 8" x 12 -  $1/2$ " for the base  
 Ruler and pencil  
 Jack plane  
 Block plane  
 Nail Hammer  
 Try square

##### PREPARATION OF THE PUPIL:

Bolstering motivation through questioning: use of games, materials used in making games; source of lumber.

DEMONSTRATION:

1. How to use and set a Block and Jack Plane
2. How to mark the project with numbers for identification
3. How to recognize the best edge
4. How to use the woodworking vise
5. How to plane the working edge
6. How to test the edge with a try square and ruler
7. When the edge is satisfactory, label it No. #1

SUMMARY:

1. Explain the setting of a Block and Jack Plane
2. Why is it necessary to identify your project?
3. How do you recognize an edge?
4. What is the first step in planing a working edge?
5. What is the purpose of the woodworking vise?

SAFETY:

Hazard of splinters  
Correct method of checking a plane

APPLICATION:

Pupils prepare their stock

DEMONSTRATION LESSON PLAN 2

AIM:

To teach pupils how to reduce stock to length and width

INVESTIGATOR'S PREPARATION:

Have on hand - -

Block and Jack Plane  
Try square  
Crosscut saw  
Rip saw  
Ruler and pencil

PREPARATION OF THE PUPIL:

Questioning about previous operations

DEMONSTRATION:

1. How to square an end and test it with the try square. When the end is satisfactory, label it No. #2.
2. How to measure to length and draw line. ( Draw a waste line  $\frac{1}{4}$ " from the length line to allow for sawing and planing ).
3. How to identify and use a crosscut saw. Emphasize stopping on the line indicating length.
4. Show how chamfer method is used in planing the end.
5. How to test end with the try square. When end is satisfactory, label it No. 3.
6. How to measure to width. ( allow for waste line ).
7. How to identify and use a rip saw.
8. How to cut on a waste line.
9. How to plane edge to dimension line.
10. How to test the edge with the try square. When the edge is satisfactory, label it No. #4.

SUMMARY:

Why is it necessary to allow a waste line after you measure the length?

When is a crosscut saw used?

How do you identify a crosscut saw?

When is a rip saw used?

How do you identify a rip saw?

SAFETY:

Starting the cut on the back strock

Correcting the position of the fingers when guiding the saw.

APPLICATION:

Pupils proceed to prepare their stock.

DEMONSTRATION LESSON PLAN 3AIM:

To teach pupils how to lay out work and bore.

INVESTIGATOR'S PREPARATION:

Have on hand - -

Ruler and pencil  
Try square  
Brace  
No. #10 Auger bit  
Nail set  
Nail hammer  
Scratch awl

PREPARATION OF THE PUPIL:

Bolstering motivation through questioning. What is the reason for laying out a job?

DEMONSTRATION:

How to lay out centers for holes.  
How to put an auger bit into the brace. Identify the parts of the bit and brace.  
How to use the auger bit and brace. Prepare for boring by making shallow pilot hole with a scratch awl. ( At this time explain the use of the scratch awl ). Use the auger bit until the spur scores the board deeply, then turn the board and drill from other side.

SUMMARY:

Why is it necessary to lay out your work accurately?  
How do you insert a bit into the brace?  
What is the purpose of the jaws?

SAFETY:

Method of carrying the brace and bit.  
Correct method of testing to find out whether the bit is coming through the board.

APPLICATION:

Pupils proceed to prepare their stock.

DEMONSTRATION LESSON PLAN 4AIM:

To teach pupils how to form the curved incline on the base.

INVESTIGATOR'S PREPARATION:

Have on hand - -

Template

Block and Jack plane

Wood Files; Flat, Round, Taper, Half round and Wood

Sand Paper Block Rasp.

Sand Paper - different grades - Medium course; Medium fine; Fine and Very fine.

PREPARATION OF THE PUPIL:

Bolstering motivation through questioning to determine the best shape of the leading edge.

DEMONSTRATION:

How to lay out a curve. ( use a flexible steel ruler or template ).

How to plane the leading edge.

How to use the different types of wood files.

How to sandpaper - make brief mention of the grades of sandpaper.

SUMMARY:

What tools may be used in laying out a curve?

Would you plane with the grain or across the grain while shaping the leading edge?

Why is sandpaper used?

Do you sandpaper with the grain or across the grain? Why?

SAFETY:

Use bench brush when removing sandpaper dust.

APPLICATION:

Pupils proceed to prepare their stock.

DEMONSTRATION LESSON PLAN 5AIM:

To teach pupils how to prepare and attach the sides.

INVESTIGATOR'S PREPARATION:

Have on hand - -

2 pieces of stock 3/8" x 12 - 1/2" x 1 - 3/4"

1 piece of stock 3/8" x 8" x 1 - 3/4"

Mitre Box and Mitre Saw

Nail Hammer

Coping saw ( plus blades )

Nail Set

Jack and Block Plane

Wire brads 1 1/4" long, No. #15.

PREPARATION OF THE PUPIL:

Bolstering motivation through questioning: Why are the sides necessary?

DEMONSTRATION:

How to plane working edges on all pieces.

How to use a mitre box to square ends, on the two long pieces and cut to the length, 11 - 3/4".

How to use dividers, allowing a slight waste for sawing and filing.

How to put a blade in a coping saw.

How to use a coping saw.

How to use a wood file to reduce to line.

How to face plane and sandpaper.

How to cut the back piece to the overall width of the game ( 8" ).

How to brad on the sides and back.

How to nail the back piece to the side pieces.

How to use the nail set.

SUMMARY:

What is a mitre box and mitre saw?

What is the difference between a coping saw and a crosscut saw?

What adjustments must be made on a coping saw before it is used?

SAFETY:

Keep both hands on the coping saw.  
 Take care in unlocking safety catches on mitre box.  
 Carry pointed tools with the points guarded.

APPLICATION:

Pupil proceeds to prepare stock.

DEMONSTRATION LESSON PLAN 6

AIM:

To put a finish on the project.

INVESTIGATOR'S PREPARATION:

Have on hand - -

Shellac and brush  
 Steel wool  
 Shellac solvent  
 Filler ( putty or plastic wood )

PREPARATION OF THE PUPIL:

Bolstering motivation through questioning: How  
 can we improve the appearance of the project?

DEMONSTRATION:

How to use a filler ( plastic wood ).  
 How to dip the bursh and remove surplus shellac on  
 the side of the container.  
 How to apply shellac without laps showing.  
 Shellac with grain.  
 Cover the surface only once.  
 Two thin coats are better than one heavy one.  
 Allow projects to dry in dust-free room.  
 Wash the brush immediately after using it.  
 How to clean brushes - use a shellac solvent, then  
 wash the brush in soap and water.  
 How to prepare and apply a second coat.  
 ( Rub down lightly with fine steel wool or sand-  
 paper ).  
 Apply the second, thin coat, as above.

SUMMARY:

What do we use to fill nail holes before shellacing?  
 and why?  
 Why is the excess shellac wiped off the brush?  
 Do you apply the shellac with the grain or across  
 the grain?



SAFETY:

Use caution in applying shellac.  
 When you have been using shellac, wash your hands  
 before eating.  
 Do not inhale shellac or solvent fumes unnecessarily.

APPLICATION:

Pupil prepares to proceed to finish project.

II - INDIVIDUAL PROJECTPROCEDURE:

For the purpose of this study emphasis was placed on the development of the pupil's ability to analyze a project in woodworking. Such analysis involved regard for size and design, selection of stock, layout, consideration of necessary tools, processes and other requirements, safety precautions and evaluation of the finished product. The practice of analyzing develops initiative and self-reliance.

PRINTED DIRECTIONS:

Pupils were taught to plan and construct projects in accordance with printed directions, such as a working drawing.

The following steps were involved in this procedure:

1. Comprehending the printed instructions.
2. Reading a working drawing.
3. Seeking additional information if the instructions were not clear.
4. Constructing the project and checking operations frequently.
5. Evaluating the finished product.

SAMPLE OF JOB SHEET USED IN THIS STUDY:MAKING A SHOE SHINE BOX - individual projectAIM:

To make a shoe shine box.

PREPARATION:

Preliminary discussion with the investigator regarding --

1. Purpose and value of job.
2. Difficulties in understanding or following directions.
3. Points or steps that require extra care.
4. Any new steps requiring demonstration.

TOOLS AND MATERIALS:

TOOLS:

Hammer - Nail or claw hammer	
Ruler	
Crosscut saw	
Rip saw	Various grades of sandpaper
Jig saw	Brace and auger bit
Mitre box and saw	Various sizes of nail sets
Try square	Block and Jack plane
Woodwork files	Flat head screw driver

MATERIALS:

2 pieces of stock -  $3/4"$  x  $5 - 1/2"$  x  $9 - 1/2"$  = ENDS

2 pieces of stock -  $3/4"$  x  $3"$  x  $10"$  = SIDES

1 piece of stock -  $3/4"$  x  $12"$  = TOP

1 piece of stock -  $3/8"$  x  $3/4"$  x  $3"$  = CLEAT

1 piece of stock -  $3/4"$  x  $1 - 1/2"$  x  $10"$  = BRACE

1 piece of stock -  $3/4"$  x  $4"$  x  $10"$  = BOTTOM

2 pieces of stock -  $3/4"$  x  $1 - 1/2"$  x  $7"$  = FEET

$1 1/2"$  RHB wood screws

2" finishing nails

Wood glue

Plastic wood

Preferred stain

Preferred varnish

**PROCEDURE:**

1. Reduce stock to size. ( using crosscut or rip saw )
2. Lay out and trace pattern on stock for the two sides of the shoe shine box.
3. Cut out ends with jig saw to get required angle.
4. Lay out and cut sides using the mitre box for a square end and required size.
5. Lay out and cut top with a rip saw or crosscut saw to required size.
6. Lay out and cut out brace to the required size, using the mitre box to square off ends.
7. Lay out and cut out legs to the required size, using a rip saw. Square off ends on the mitre box.
8. Bevel ends of legs with file and sandpaper.
9. Round top with file and sandpaper.
10. Sandpaper all required pieces before assembling.
11. Nail the sides and bottom together.
12. Nail ends to side and bottom.
13. Nail brace and top piece, then nail between ends.
14. Nail feet and cleat in place.
15. Sand smooth and round edges.
16. Stain shoe shine box with desired finish ( stain, varnish, etc. )

**EVALUATION:**

1. Practical value of the project.
2. Layout design.
3. Suitability of finish
4. Workmanship: Understanding and following directions, accuracy, proper use of tools, and proper safety precautions used.

### III - GROUP PROJECT

A group project is one that requires the combined activity of two or more pupils. It is valuable in that it fosters such traits as leadership, cooperation and respect for the activity of others. The pupils in this study selected the "seat and book chest" as their project.

#### GENERAL PLAN:

The subjects were assigned to two groups. A foreman was selected from the eight mentally retarded adolescent subjects. The planning of the project included the purpose of the project, the design, suitable materials, component parts, details of construction, stain finish and evaluation.

1. The foreman oversees the activities of the group.
2. Individuals were assigned to the construction of component parts. The construction of each part involved:
  - a) Layout
  - b) Cutting materials
  - c) Reducing materials to size
  - d) Preparing the finish
  - e) Work inspection of component parts
  - f) Assembling
  - g) Applying decoration ( if needed )
  - h) Attaching handles, hooks and other accessories

#### SAMPLE OF JOB SHEET USED IN THIS STUDY:

##### AIM:

How to construct a Seat and Book Chest.

##### PREPARATION:

Preliminary discussion with the investigator regarding --

1. The purpose and value of group activity
2. Difficulties in understanding and following directions
3. The importance of cooperation in group activity
4. Points and steps that require extra care
5. Any new steps requiring demonstration

#### TOOLS AND MATERIALS:

##### TOOLS:

Nail hammer	Brace and bit ( auger )
Ruler and pencil	Countersink for screws
Crosscut saw	Block and Jack plane
Rip saw	Jig saw
Mitre box and saw	Various sizes of nail sets
Try square	Sandpaper block
Various woodworking files	
Screw drive - ( flat head )	

##### MATERIALS:

2 pieces of fir plywood -  $\frac{1}{2}$ " x 14" x 31" = front and back

2 pieces of fir plywood -  $\frac{1}{2}$ " x 14" x 15" = sides

1 piece of fir plywood -  $\frac{1}{2}$ " x 16 -  $\frac{1}{2}$ " x 32" = top ( lid )

1 piece of fir plywood -  $\frac{1}{4}$ " x 15" x 29" = bottom

1 piece of fir plywood -  $\frac{1}{2}$ " x 6" x 15" = inside divider

4 pieces of s-pine - 1" x 1" x  $12\frac{1}{2}$ " = corners

2 pieces of s-pine -  $\frac{5}{8}$ " x 2" x 13" = top decoration ( sides)

1 piece of s-pine -  $\frac{5}{8}$ " x 2 -  $\frac{5}{8}$ " x 27 -  $\frac{3}{4}$ " = top decoration  
( back )

2 brass hinges

2 brass handles

12  $\frac{1}{4}$ " x 2" stove bolts

20 1- $\frac{1}{4}$ " #8 wood screws

**PROCEDURE:**

1. Reduce stock to size, using crosscut or rip saw.
2. Lay out and trace pattern on stock for the front and back pieces.
3. Lay out and trace pattern on stock for the two side pieces.
4. Cut out curves of legs for the front, back, and two side pieces on a jig saw.
5. Square and cut out top piece.
6. Lay out and trace decorations for top piece out of white pine.
7. Cut out decorations on a jig saw.
8. Cut out corners using the mitre box and saw to square off the ends.
9. Cut out divider to required measurements, using a rip saw or a crosscut saw.
10. When all component parts are cut out, prepare each part for sanding, using various grades of sandpaper. ( sand block should be used ).
11. When sanding is completed, assemble component parts using wood glue,  $1\frac{1}{2}$ " finishing nails,  $1\frac{1}{4}$ " - #8 wood screws, and  $\frac{1}{4}$ " x 2" stove bolts.
12. When all pieces are assembled, prepare project for staining and varnishing.
13. When stain and varnish is completely dried, attach hinges and handles to project.

**EVALUATION:**

1. Practical value of the project.
2. Suitability of finish.
3. Accuracy in lay out design.

**4. Workmanship:**

- a) Understanding and following directions.
- b) Cooperation with co-worker.
- c) Proper use of tools.
- d) Proper safety precautions used throughout the project.

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