ABSTRACT OF THESIS

A VOCATIONAL EDUCATION PROGRAM FOR THE LOWER RIO GRANDE VALLEY OF TEXAS, BASED UPON NEEDS

Submitted by

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In partial fulfillment of the requirements

for the Degree of Master of Arts

Colorado State College

of

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ABSTRACT

The present study is an investigation of the specific needs for vocational education in the area known as the Lower Rio Grande Valley of Texas. This Valley is an irrigated citrus and vegetable area with Mexico on the south, the Gulf of Mexico on the east, and an arid ranch country on the north and west practically isolating the area from the rest of the State.

There are about 40 towns in the Valley up to 30,000 in population. There are twenty-three accredited high schools with college preparatory courses. Only three vocational courses are offered in the Valley, a course in auto mechanics at Edinburg and at Weslaco, and a general building trades course at La Joya.

The problem.--The question to be answered is: What plan of vocational education will meet the needs of the Lower Rio Grande Valley of Texas? Subordinate questions have been:

1. What are the needs for Vocational Education in the Lower Rio Grande Valley?
2. What agencies already exist which help to meet these needs?
3. What needs still exist in this area which should be met by new classes?

4. What plans are in use elsewhere to meet the needs similar to those of the Valley?

Materials and methods.--A list of occupations was needed to determine the type of work carried on in the Valley and the number of workers engaged in each type. A tentative list was obtained from the Industrial Classification and codes for use in public employment offices. This list was supplemented by information obtained from the chamber of commerce and by personal survey.

The survey forms were devised by three members of the State Department of Education, the Superintendent of Schools of Weslaco, and the writer.

The first form was used for listing the trades and occupations of all the firms interviewed.

In the survey forms the workers were classified as journeyman, skilled apprentices or semi-skilled workers, and helpers or un-skilled workers.

The second form gave space for the answer to ten questions pertaining to race, age, wages, and training of workers, the number of new workers needed each year, and the kind of pre-employment training desired by the employers.

The third form was in the nature of a questionnaire which listed nine specific questions covering the possibilities for advancing from the lower into the skilled-worker class, and the training necessary or helpful to employees in making this advancement.

The survey committee composed of two or more people from each school district made a census of the business establishments in the area and gathered information from interviews with the employers. The three forms mentioned above were used for recording this information. The committee surveyed eighteen of the twenty-three school districts.

The writer was held wholly responsible for the completion of the survey in La Joya, Mission, Pharr, Alamo, Edinburg, and Weslaco school districts. He was also responsible for the final collection of data for the entire area.

Certain scholastic data taken from the reports of the various school superintendents were tabulated and used in finding the number of possible trainees. Such data were also used in determining a possible training center for vocational education for the Valley.

Seven points were considered as possible training centers. The method of determining the most desirable point will be explained in connection with a summary of the findings.

Summary of the findings

A map of the Valley was prepared showing the three counties which were surveyed. Population trends over a ten-year period were secured from the census reports for the three counties. The total population for

1938 was 208,300, as compared to a total for 1930 of 168,043.

The difference in apportionment of population by races for the Valley as compared with the state showed that the Valley had 52 percent Latin Americans, 47 percent Anglo-Americans, and one percent colored, as compared with the state which has 12 percent Latin-Americans, 73 percent Anglo-Americans, and 15 percent colored.

The survey of the Valley as to pay-roll jobs showed a wide variety of occupations. As compared with the United States as a whole, the occupational groups of the Valley are more definitely agricultural, this including 48 percent of all employed persons, as compared with 24 percent for the United States. In the other types of employment the Valley is approximately on an equal basis with the rest of the country.

The survey did not include agriculture, since it was evident that vocational training was needed for agriculture.

The survey found 70,407 employees distributed throughout the Valley in every kind of employment, ranging from as low as one person employed in an occupation in one district to as high as 152 in the same occupation in another district. The pay-roll jobs were distributed throughout the Valley with no labor concentration in one point.

The annual turn-over in the pay-roll job was 9 percent for the Valley as compared with 5 percent for the United States. The grand total of the annual turn-over for the Valley was 2,430--not including the unskilled labor. This turn-over was distributed throughout the Valley in a closely uniform manner.

Limiting the occupations to those provided for in the Smith-Hughes and George-Dean Acts, the turn-overs for the following pay-roll jobs were used in making the recommendations for a program for vocational training for the Valley as a whole:

Household service and beauticians	184
Institutional service	131
Machine shop workers	180
Automobile mechanics	85
Building tradesmen	284
Electricians	44

In determining the needs from the scholastic standpoint a study was made of the superintendents' reports. These reports showed 55,872 children of school age, only 75 percent of which were enrolled in school. Of the 75 percent who are enrolled, 28 percent were absent daily. In the age group from 14 to 18, only 41.8 percent are in school.

In selecting a possible training center, seven points were chosen and the number of children counted in

certain radii of these centers. This shows sufficient trainees within distances easily accessible to the point selected.

Discussions of findings.--The Valley is a big community and considers its problems as a whole in business and government. In the consideration for vocational training it should also be considered a Valley problem.

The workers employed in the various occupations do work which is of a general nature, rather than highly skilled in nature.

The training should be for these jobs as they are and where they are found.

The state will give vocational aid to classes which are set up with a minimum of pupils.

The following occupations have sufficient turnover to justify classes of ten or more:

Automobile mechanics
Machine shop workers
Building trades workers
Electrical workers
Cosmetology
Household service

A centralized school giving these courses, with others to make a complete program, is recommended for the last two years of high school and for those persons 16 or more years old regardless of education qualifications.

The courses selected have been checked and approved by two leading men or women in each field recommended.

In selecting a place for a centralized school the following things were considered:

1. Central location
2. Accessibility to all parts of the Valley.
3. The kind of roads.
4. Availability of gas, electricity, phone, water, sufficient land.
5. Elimination of factional opposition.

After having considered these, the point for the main highway at the Hidalgo-Cameron County line was selected as the best location.

T H E S I S

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COLORADO STATE COLLEGE

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AGRICULTURE AND MECHANIC ARTS

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY Hamp S. Edwards

ENTITLED A Vocational Education Program for the Lower Rio Grande Valley of Texas, Based upon Needs

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF Arts

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

A VOCATIONAL EDUCATION PROGRAM FOR THE LOWER RIO GRANDE VALLEY OF TEXAS, BASED UPON NEEDS

Chapter I

INTRODUCTION

The history of Vocational Education in the United States shows a constant increase, beginning in 1918 with 164,183 students and increasing constantly, except 1932, to a total of 1,344,644 in 1937. With its beginning in the industrial centers and centers of greater population, it has grown until today it is reaching into every type of community (15). With this growth has come the problem of how to fit vocational education into the needs of the smaller or rural sections. It is with this problem that the writer is most concerned.

The plans for serving the needs of the small communities have developed along several lines,--part time diversified occupations programs, the itinerant teacher, and others. The use and application of these plans have in part met the need in various communities

and seem in some cases to be the ideal arrangement for giving Vocational Education (2). However, the problem of setting up a plan to meet the needs for various areas seems to have many phases. A plan which may meet the needs of one area may have to be modified to meet conditions of another section of the country.

The consideration of these various factors led the writer to make an investigation of the specific needs for Vocational Education in the area known as the Lower Rio Grande Valley of Texas.

The Lower Rio Grande Valley of Texas, an irrigated area, is bounded on the south by the Rio Grande River, which is the boundary between the United States and Mexico. On the east is the Gulf of Mexico and on the north and west is an area of dry land more than 100 miles in width. This peculiar geographical location has caused some to think of this area as almost a state within a state. The climatic conditions are different from those of any other part of the state, being semi-tropical. The area is approximately 80 miles long and 30 miles wide and has a population of 200,000. The industries are citrus culture, general farming (including cotton, corn, and vegetable gardening), and the usual industries found in small towns in such areas.

There are about 40 towns, ranging from less than 100 to 30,000 in population. There are 23 accredited

high schools and some smaller schools giving high school work which is not accredited. With certain exceptions, the high schools are not giving courses which in any way meet the needs for Vocational Education for this area. It is with the problem of finding the needs and recommending a plan for Vocational Education for this area that this study deals. (See map, Figure 1, Chapter IV, page 33.

Historical background of the problem

In 1933 a response, or even a mild interest, in Vocational Education was hard to arouse among the school people, as well as other citizens. Therefore, the writer decided that more interest should be developed along vocational lines in the schools of this area, in order that people might have enough knowledge about Vocational Education to make an intelligent decision regarding their training needs.

After having discussed the matter at every opportunity for several years, the writer began to display the work his pupils produced in the mill cabinet shop of LaJoya High School. These displays were set up at every available public gathering, such as the Valley Mid-Winter Fair at Harlingen, the Mission Citrus Fiesta, and various private displays in Mission and McAllen. Then the people began to talk of the value of such training. Hobby clubs invited the writer to talk to

members. From these activities the interest in the possibilities of vocational education spread to social, service, and commercial clubs, which afforded the writer many opportunities to educate the people about the importance of Vocational Education.

After four years, sufficient interest was shown to justify the proposal of a survey to determine the needs for Vocational Education in the Valley. Much credit should be given to Mrs. H. E. Butt of Harlingen for her cooperation and financial help in getting this early promotional work done. Mrs. Butt has long been active in promoting Vocational Education in the Valley, especially for under-privileged girls.

During the early part of the summer of 1938 the writer, with the help of superintendents of schools, service clubs, and business and professional men, started an intensive campaign to get the state Department of Education to cooperate in making the proposed survey. Early in November, 1938, Mr. James R. D. Eddy, State Director of Vocational Education for Texas, sent Albert Kruger, James Hill, and Ralph Barton to the Valley to assist in making the survey. In a conference between these men, the writer, and other members of the steering committee, the survey forms were agreed upon.

The area was to be surveyed by school districts and the work of making the survey was divided among

certain members of the survey committee. In addition to some general supervisory duties, the writer became responsible for making the survey for the west half of Hidalgo County, and the full responsibility for the completion of the survey for Mission, Pharr, Alamo, and Weslaco.

In the Appendix will be found newspaper clippings which will substantiate the statements made above. It is on this survey that the recommendations of this study are based.

Out of the question, "What plan of Vocational Education will meet the needs of the Lower Rio Grande Valley of Texas", came certain subordinate questions that had to be answered. These questions are:

1. What are the needs for Vocational Education in the Lower Rio Grande Valley?
2. What agencies already exist which help to meet these needs?
3. What needs still exist in this area which should be met by new classes?
4. What plans are in use elsewhere to meet the needs similar to those found in the Lower Rio Grande Valley?
5. What practical application of plans used elsewhere may be applied to the needs of this area?

Much interest has been minifested in finding a solution to the needs for Vocational Education in the rural areas and the smaller towns. Certain investigations have been made dealing with the problems of this kind.

The writer has made a survey of all available literature to find what investigations have been made and to see how the findings of those investigations may aid in solving the vocational educational problems of the Lower Rio Grande Valley.

Chapter II

REVIEW OF LITERATURE

The review of research pertinent to this study has revealed findings which relate to questions one, four, and five of the problem analysis given at the end of chapter one. The research findings that in some manner answer question one, What are the needs for vocational education in the Lower Rio Grande Valley, are given below.

In 1930 Adolph (1) made a survey of the schools of Arizona, in which he attempted:

1. To ascertain and list the different fields of prevocational, vocational, and industrial arts offered in the junior and senior high schools of Arizona,
2. To determine the industries of the state and compare them with the offerings of the secondary schools,
3. To find out if the courses offered in the schools are related to the industries in the community where they are taught.

The data were gathered by two sets of questions. The first questionnaire was sent to the provocational, vocational, and industrial arts teachers of the state; 62.5 percent replied. The second questionnaire was sent to all the secretaries of Chambers of Commerce in the state; 90 percent of these were answered.

The data revealed that industrial arts were offering woodworking, mechanical drawing, metal work, auto mechanics, printing, and electricity. Machine shop and auto mechanics were offered as combined courses in trades and industry, while farm mechanics and agriculture made up the vocational courses. Woodwork and mechanical drawing led in the number of courses offered.

The Chambers of Commerce and the instructors are in agreement as to the chief industries of the state. The first ten industries in order of rank are agriculture, mining and smithing of copper, ranching, dairying, truck farming, poultry raising, mercantile, railroading, commerce, and manufacturing.

With only two exceptions, every community offered vocational and industrial arts courses which are directly related to the industries of the community. The conclusions are that the junior high schools and the senior high schools of Arizona are in a large sense meeting the needs for prevocational and vocational education for the state.

The findings of this study were used as a basis for recommending certain improvements and additions to the courses now offered. This is an interesting study in that it revealed that the state of Arizona as a whole was making an attempt to give those courses which have a direct relationship to the industries found in the communities.

The information contained herein may well be used as a basis on which to present recommendations for the Lower Rio Grande Valley. Should the findings of the Valley area show a need for improvement, this study is an excellent example of what can be done in small communities where there is a desire to serve the vocational education needs.

Albright (2) in 1937 made a survey to determine a training program for diversified occupations, in order to find the training needs, job specifications, and procedures in employing beginners in 25 kinds of industries in Cheyenne, Wyoming. Twenty-five kinds of industries were selected from the records of the placement bureau of Cheyenne High School. The information was obtained from 95 firms. The writer made the survey by personal interviews. The information obtained in the ordinary conversational manner (regarding what the employee should know and should be able to do) was recorded on a job-analysis sheet for each firm.

This survey showed what the youth need upon entering an occupation. An attempt was made to set up the qualifications necessary for each of the 25 different kinds of occupations. On the basis of these findings, the writer set up his recommendations for certain course contents for diversified occupations in order to prepare the youth for his job as nearly as possible.

The industries, in the major part, were the same as those found in the Lower Rio Grande Valley in towns of similar size; so much so that Mr. Albright's checking list could be used for the survey problem of the Rio Grande Valley. This checking list also suggested a valuable list of forms for this study. The job specifications could be used in the Valley survey, with minor changes to meet local climatic conditions.

The similarity of his problem to that of the Valley, however, stops with the single town factor; the Valley survey is for the needs not only of many such towns, but a large rural area as well.

It should be remembered, moreover, that this study deals only with diversified occupations, while the Valley survey deals with all vocational needs.

Dolley (9), in 1934, made a survey of vocational training opportunities for senior high school students in Jacksonville, Florida. An analysis was made of the all-day trade schools in use in the United States to see how they would fit the needs of this kind of community.

A personal survey was also made of the set-up in the local high schools to see what was needed and what training possibilities existed. The survey revealed that practically no vocational training was offered in the high schools of Jacksonville, that funds were not available with which to set up the system, equip the shop, and

employ teachers for an all-day trade school. Furthermore, the all-day trade school did not meet the needs as they had been found to exist. Some form of vocational training should be given which covered a wider field than that in operation or that which would be offered in the all-day trade school.

The climatic condition and the general industrial and social surroundings of Jacksonville are similar (in many ways) to those of the Lower Rio Grande Valley. With certain modifications and adjustments of the means by which this survey was made, it could in part be used in the survey which was proposed for the Lower Rio Grande Valley.

Certain parts of this survey are valuable aids. The forms used and the manner of obtaining information have given the writer aid in working out the survey for the Lower Rio Grande Valley.

Allie (4) made a survey of the schools of Boyd County to find the distribution of school population, and the adequacy of the present buildings, equipment, and supplies, and enrollment in secondary schools. The study points out the defects of the present system, which fails to meet the needs adequately for this area. The study recommends a reorganization of the system providing for consolidation, transportation, adequate buildings, and equipment.

This study in many ways fits the one which the writer is making. The same procedure has been used to find the needs for vocational courses for the Rio Grande Valley. The difference between this study and that of the writer is that he is interested in Vocational Education and this study deals with academic as well as vocational training. With certain changes the findings may well be applied to the Lower Rio Grande Valley.

In a bulletin by the U.S. Federal board for vocational education (19) is an analysis of the problem of determining the needs for a vocational education program. It is divided as follows:

Part I. Section 1. Objectives of the study
2. General outline of the plan
3. The proposed procedure to be carried out by the local people

Part II. Questions to be answered
Section 1. Basic questions
2. Detailed questions
3. Key list of items of information asked for

Part III. Key list of items of information necessary to answer the main question

Part IV. How the items of information may be applied to the questions to be answered

Part V. Sources of information

Part VI. Methods of securing information

Part VII. Suggestions as to procedures in utilization of the information secured

This bulletin is intended to help analyze the work of setting up a survey and to suggest ways of making

surveys. The information is concise and clear and is a valuable aid to any group in the early stages of a survey of an area. It also sets up a plan for the use of the survey findings.

In the early planning of a survey many questions arise which cannot be answered satisfactorily without dependable information. In preparing this bulletin the writers fore-saw these questions and set up ways of arriving at satisfactory answers.

The general methods set forth in the bulletin were used as a guide in making the survey of the problem under consideration in this thesis. The research findings that in some way answer question four, What plans are in use elsewhere to meet needs similar to those found in the Lower Rio Grande Valley? are given below.

Dial (8) made a comparative study of the county unit system of Utah and the district system of Oklahoma. Three counties in each state as nearly alike in area and population as possible were selected as a basis for comparison. The comparison was based on the following points:

1. Adequacy of educational program
2. Number of districts and board members
3. Size and number of schools
4. Holding power
5. Pupil-teacher ratio
6. Number of pupils transported and cost of transportation

The data were obtained from the departments of

education in each state, annual reports of the state superintendents in each state, the county superintendents in each county compared, and research bulletins of the National Education Association. The findings revealed that:

1. Oklahoma was only 89 percent as adequate as Utah
2. Oklahoma has 14,000 school board members for 4,755 districts; Utah has 205 board members for 40 districts
3. The enrollment in Oklahoma was 86 percent of enumeration; Utah's was 95 percent
4. The average daily attendance was 72 percent for Oklahoma, and 83 percent for Utah
5. Eighty percent of the elementary schools of Oklahoma are one-teacher schools, while 29 percent (in Utah) are one and two-teacher schools
6. The average enrollment per elementary school in Oklahoma was 93, and in Utah it was 172.
7. Eighth grade enrollment in Oklahoma was 46 percent of the first grade, and 91 percent in Utah

The conclusions reached are:

1. That Utah is more able to support education, exerts practically the same effort, and has more adequate educational programs than Oklahoma
2. That the findings in the counties compared confirmed the findings for the states as a whole
3. That the county unit plan is far more efficient
4. That the per capita cost is greater in Utah
5. That the county unit system of Utah surpassed the district system in every criterion

The purpose of this review is to see how the larger units of administration compare with the smaller units. This comparative study was based on the educational system as a whole but could easily be compared with a program for Vocational Education based on a similar plan. It is very evident that if it is more efficient to combine units for general education it would also be so for Vocational Education. This study may be used as a basis for presenting certain recommendations which will grow out of the survey for Vocational Education needs for the Lower Rio Grande Valley.

Loftin (13) made a survey of the educational needs of the Mexican population of San Antonio, Texas. These data are based on a survey of 1927. The percentage of Spanish names on the school rolls was compared with others. The percentage of Spanish names of March, 1925, in the system was 43, as compared with 53.9 for March, 1926. This shows the rapid proportional increase in Spanish population.

A sociological survey of the housing conditions was made. The average number of children per family was found to be 4.51. The average beds per family was 2.55. The number of rooms per family was 2.89.

After looking into the situation, an attempt was made to formulate a curriculum which would best suit the needs of the Mexican children. Prevocational courses

were put into the program--music, homecrafts, art, choral, orchestra, health education. The school was equipped with excellent shops, which were removed from the class room building. These shops were woodwork, paint and trim shop, printing, sheet metal and elementary plumbing, general machine, and business training, these being set up as fields of exploration. Various tryout courses were put into the program, where the boy went from shop to shop to get experience in as many fields as possible. After these tryouts he was finally located in the shop where he seemed to fit best.

This study is based on a situation in south Texas where the Mexican population predominates. An attempt was made to find what could be done to aid these boys and girls in becoming more desirable citizens. This is not a theoretical philosophy but a reality. It is here that the school has actually been made to fit the needs of the Mexican pupils. This school population is 91 percent Mexican.

Schaefer (16) made a study of the county high schools in the western states, especially Colorado, from 1931 to 1935. The county is taken as a basic educational unit. The survey was for the purpose of studying the efficiency and educational advantages to be found in county high schools. The provisions for county high schools were varied in the states. The inadequacy of the

present system for rural educational opportunities was emphasized in the study. The study considered two phases of the county high school:

1. To determine the legal status of county high schools as provided by law.

2. To evaluate the county unit as compared to the absence of such system.

The problem was attacked in the following manner:

a. Analysis was made of the laws of 11 states providing for county high schools.

b. Data on the county high schools of Colorado were obtained from the state superintendent of public instruction.

c. A study of the 22 counties having county high schools in Colorado was made which contained the following information:

   1. Location of school
   2. Date established
   3. Enrollment
   4. Number of graduates
   5. Number of teachers and salaries
   6. Instructional costs
   7. Value of buildings and equipment
   8. Receipts
   9. Disbursements
   10. Mill levies
   11. Indebtedness
   12. Financial summaries

The information obtained regarding the laws of the states studied showed a wide variation in the plans for county high schools. Two of the states have laws which are now functioning--Oklahoma and Wisconsin. Two states provide transportation and two have provisions for erecting dormitories.

The enrollment showed a constant increase in county high schools from 1930 to 1933. The number of

graduates increased at a more rapid rate than the number of pupils enrolled. This shows that a larger percent graduate than in the non-county high school systems. Moreover, the cost of instruction per pupil is less in the county unit. The majority of the county high schools showed a net balance in funds annually.

The facilities for instruction are far superior and the instruction is more uniformly of high standard. The study, while not finding the county high school an ideal, has found that it is a very desirable organization for those areas which do not have towns large enough to provide adequate facilities for high schools. It is also very desirable for meeting the needs of the rural boys and girls.

This study, while based on the county high school for general education, could well be applied to Vocational Education.

The reason for county high schools is to provide a uniform opportunity for education for all boys and girls in the county. The same might well be said of the needs for Vocational Education for all.

The purpose of reviewing the county high school studies is to see how such an organization might be modified and made to serve the Valley for meeting the needs for Vocational Education. The research findings which in some manner answer question five, What practical applications of plans in use elsewhere may be applied to the

needs of this area, are given below.

Estes (10) made a study in which schools of similar size in Virginia were grouped together to determine what is being done vocationally, and how these schools compare in the amount and means of meeting these needs. Great variations were found between schools of similar size with reference to these facilities. Needs for very great increases in offerings for vocational courses were discovered. A more efficient bus system for transportation of the pupils was also found to be needed.

As a means of meeting these needs a system of consolidation was recommended.

The findings of this survey regarding the needs for vocational education of towns of similar size may be applied with some modifications to certain towns in the area studied by the writer. A number of the towns covered by the two surveys are approximately the same in population and general industrial nature.

The findings of this survey involve not only vocation but general education as well, while the writer is concerned only with the problems of Vocational Education.

Michael (14), in 1932, made a survey which studied the trade schools of western Missouri and attempted to determine (a) what trades are taught, (b) the number of students enrolled in trade schools, (c) the

preparation and efficiency of teachers, and (d) the cost of maintaining this type of education.

The data were obtained through personal interviews with leaders in the field of trade and industrial education, by personal check of the records in the state office of Vocational Education, and by mailing rating scales to teachers of trade subjects and teacher trainers. Sixty rating scales were sent out; 55, or 91 percent, were returned.

The study revealed that the trades being taught were the type that would naturally fit into the life of an agricultural community. Enrollment for a 5-year period showed the following tendencies. The first year had the largest enrollment; the second and third years had a 50 percent drop; the fourth and fifth years showed a great increase.

The state offers and requires efficient training for teachers. The study further reveals that the teachers are constantly improving their efficiency by taking the training offered by the state department of vocational teacher training.

According to the best available data on the cost of secondary and trade education, trade education costs less than secondary education.

The survey revealed that the courses offered in the trade schools of western Missouri are such that

they function directly in training the student for the occupation he expects to follow. The training enables him to begin work as an economic asset to his employer.

It is recommended that all local communities be encouraged to give more support to organization of classes in industrial education. The study revealed the situation of Vocational Education in western Missouri and further shows that something is being done to meet the vocational needs. The findings of this study are valuable aids in formulating a basis for recommendations for the survey which is under consideration for the Lower Rio Grande Valley. This study is a good example of finding a need for and the establishing a program to meet the need in Vocational Education in a given area.

The review of research findings has revealed leads and partial answers to questions one, four, and five, but has not provided complete answers to any of them. Therefore the answers that are needed will be sought in further study involving the collection of original data.

Chapter III

METHODS AND MATERIALS

The present chapter deals with the general procedure, agencies, methods, and devices used in obtaining information regarding occupations, occupational needs, and possibilities for training in the Lower Rio Grande Valley of Texas.

In addition to the persons mentioned in the introduction, the following groups assisted in making the survey:

1. The steering committee, composed of Superintendent McConnell of Weslaco as chairman and the superintendents of the various school districts of the Valley, with the writer serving in the place of the superintendent from his own school.

2. The local survey committee, composed of one to three persons appointed by the superintendents. Nearly all these were teachers, although in some cases the Chambers of Commerce of the cities in the Valley took part.

A list of occupations was needed to determine the types of work carried on in the Valley and the number of workers engaged in each type. A tentative list was first obtained from Industrial classifications and codes for use in public employment offices (18). This list was supplemented by information obtained by interviewing the secretaries of the Chambers of Commerce of the cities of

Mission, McAllen, Weslaco, Mercedes, and Harlingen, which listed some of the occupations peculiar to the Valley. This was further supplemented by first-hand information from the steering committee itself. This procedure was necessary because the rapid growth of the Valley had given rise to some occupations not listed in the bulletin mentioned.

The next step in the procedure was to devise forms that could be used in recording the information obtained from the employers of the Valley. Three such forms were adopted.

The survey forms described in this chapter were devised by the three members of the state department of education (see Introduction, page 4), Mr. McConnell, and the writer. The writer was held wholly responsible for the completion of the survey in La Joya, Mission, Pharr, Alamo, Edinburg, and Weslaco.

The first form was designed for listing the trades and occupations of all employees of the firm interviewed, and was so arranged that the number of employees in each classification could be listed under the subdivisions (a) journeyman or skilled, (b) apprentices or semi-skilled, and (3) helpers or unskilled. Columns were also provided for showing the number of male and female workers in each subdivision.

The second of these three forms gives space for

the answers to ten questions pertaining to the race, age, wages, and training of workers, the number of new workers needed per year, and the kind of pre-employment training desired by the employers.

The last form is in the nature of a questionnaire which lists nine specific questions covering the possibilities for advancing from the lower into the skilled-worker class, and the training necessary or helpful to employees in making this advancement.

Sources of data

The purpose of vocational education is to train w orkers for specific occupations. To justify this training in any one region, information regarding the occupations in the region must be obtained from direct and reliable sources.

For this study the most reliable sources are the employers themselves. Therefore the survey committee made a census of the business establishments of the area, gathering its information from interviews with employers or with those authorized by the employers to give it. The committee covered 18 of the 23 school districts in the area. The interviewer recorded the information on Forms 2, 3, and 4, which were stapled together. Where possible the exact words of the interviewee were used. More than 6,000 interviews were held. This sample represented about 95 percent of the employers of the Valley.

In locating possible training centers the first step was to find the number of young people within 10, 15, and 20 miles of certain points. This was done by making a map of the area, describing circles with these points as centers and with radii of 20 miles, and determining from the total school census the number of young people within each circle. Because of geographical location the seven points considered were County Line, Edinburg, Harlingen, Mercedes, McAllen, San Benito, and Weslaco.

It was also necessary to make an estimate of the possible and future trainees. In order to get this information as accurately as possible, the total school census, in school and out, was taken into consideration. The estimates are based on 85 percent of that total, this being the percent of young people in Texas who do not attend college, according to the annual report of the state superintendent of instruction.

Population information was taken from the United States census of 1930 and the Texas Almanac of 1939.

The methods that have just been described were used to secure data from these sources: (1) employers of the Lower Rio Grande Valley, (2) U.S. Census of 1930, and (3) Texas Almanac, 1939, and (4) school census as given in superintendent's reports of 1938. The findings are tabulated in Chapter IV.

Chapter IV

FINDINGS

Using the materials and methods of Chapter III revealed certain findings. These findings are tabulated and explained in this chapter. The map of the Valley is included to show the area which was covered by this survey. It also shows the distribution of the towns, and the most thickly settled area is indicated by the approximity of the towns.

The various figures and graphs are arranged in logical order, in such a way that the thought goes from the population to the distribution of the population by races. The list of occupations of the various groups is then shown in the percentage distribution of the various occupations. A look is taken at the number employed and at the turnover in the various occupations.

The second part of the findings deals with the number in school and the number out of school, as well as the total school census. This school census is then used to find the number of children, both in school and out of school, that are found in certain areas of this section.

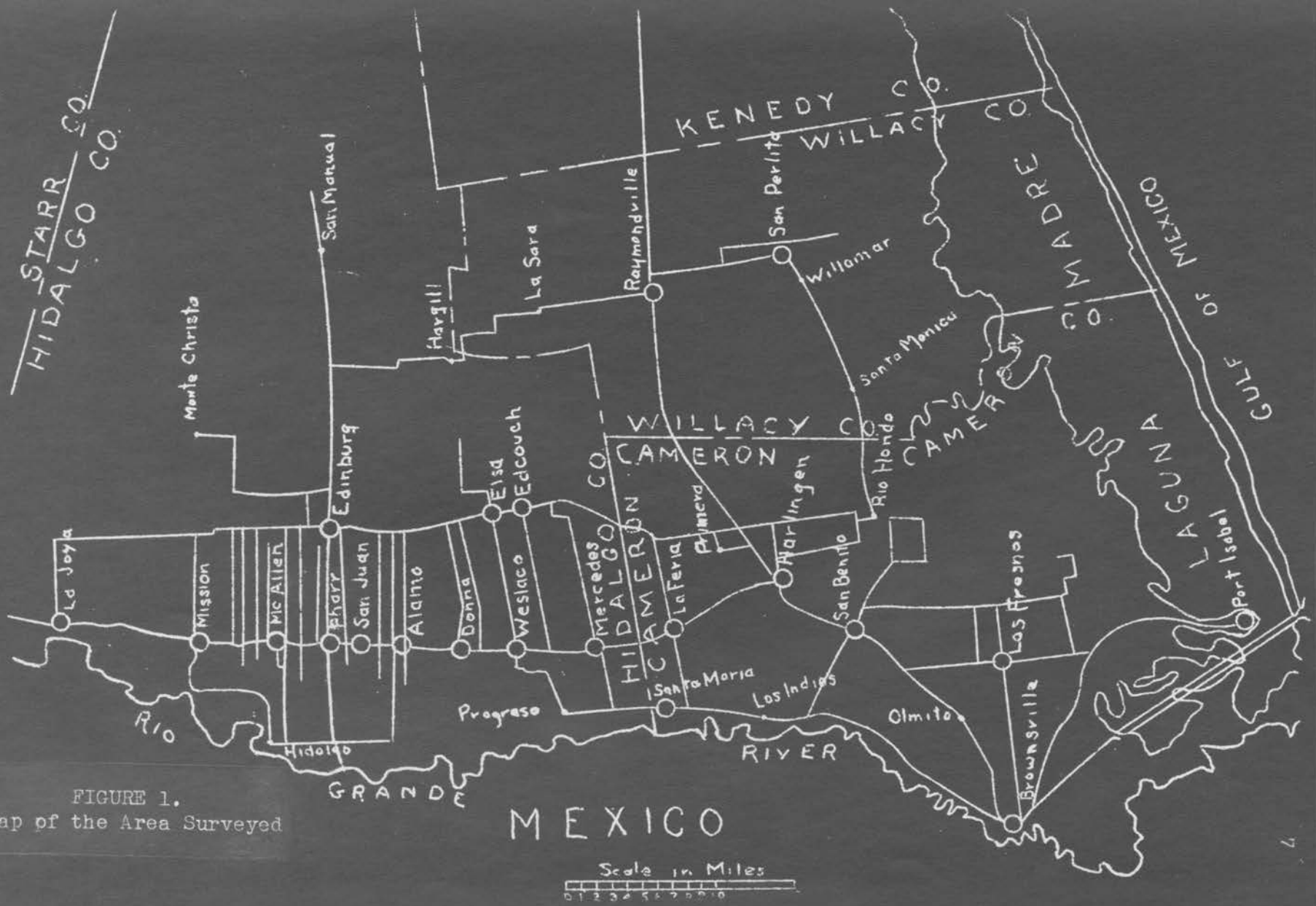


FIGURE 1.
Map of the Area Surveyed

The area on both sides of the road from La Joya to San Benito, as shown on the accompanying map, is the most heavily populated. This section is the principal center of citrus development in the region. Between this area and the Rio Grande River is what is known as "first life" land, so called because irrigation water is brought here from the river by the first series of pumps.

The eastern part of the map, along the Gulf of Mexico, is primarily marsh land, and the section north of the central citrus belt is largely unirrigated range land.

A new irrigation system is now being built in the Hargill-to-San Perlita area and the section between this and the present citrus belt. The probable future development will shift toward this area. The exact population of the three counties shown on this map is given in Figure 2.

Table 1.--POPULATION OF LOWER RIO GRANDE VALLEY SURVEY AREA 1/

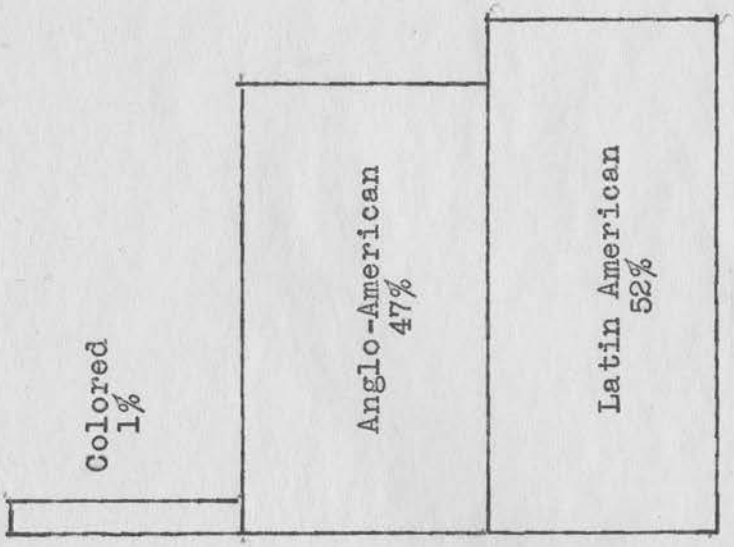
Year	Cameron	Hidalgo	Willacy
1930	77,540	77,004	10,499
1938	91,300	97,500	19,500
Totals	For 1930 - - - - - 165,043 For 1938 - - - - - 208,300		

1/ Data shown on this chart was taken from the United States 1930 Census reports and from the 1939 Texas Almanac.

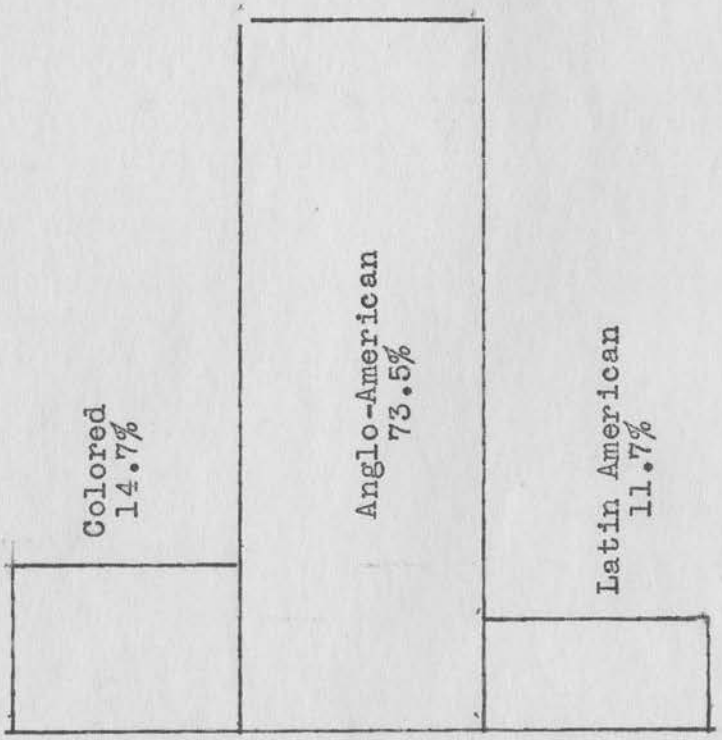
Figure 2 gives the actual population of the area by counties. Hidalgo County, at the western end of the Valley, is slightly larger in population than Cameron and five times as large as Willacy. The total population of the Valley has increased from 165,043 in 1930 to 208,300 in 1938. Practically half of this growth has come in Hidalgo County.

Figure 3 shows how this population is distributed by races and how this distribution compares with the state as a whole. The population of the area is shown by races. Unlike the rest of the state of Texas, the Lower Rio Grande Valley has only a very small Negro population (one percent). On the other hand, more than half the population of the area is Latin American (52

percent), five percent more than the Anglo-American portion.



Apportionment of the Valley population by races
Taken from the Texas Almanac, 1938



Apportionment of the state population by races
Taken from the United States Census, 1930

Figure 2.--APPORTIONMENT OF POPULATION BY RACES

The occupations in which this population is engaged are given in a list that follows. This is a complete list of the occupations found in the Valley and the payroll jobs in these occupations. This table has already been referred to in the first part of Chapter III.

In this list are 21 general types of occupations, each subdivided into more specific occupations and payroll jobs.

Agencies--Miscellaneous

General insurance
Life insurance
Real Estate
Title and mortgage

Types of workers
- Accounting
- Auditing
- Bookkeeper
- Cashier
- Insurance agent
- Real estate agent
- Secretary
- Salesmen
- Abstractors
- Typists

Agriculture

Dairy farming
Diversified farming
Poultry raising
Ranching
Cotton farming

Types of workers
- Cattle farmer
- Cattle ranchman
- Cotton planter
- Dairy farmer
- Dairymaid
- Dairyman
- Farmer, general
- Farm foreman
- Farm manager
- Farm superintendent
- Goat keeper
- Goat ranchman
- Laborers
- Market gardener
- Owner
- Sheep ranchman
- Truck farmer

Automobile industry

Accessories and parts
Batteries and tires
Garages
Paint shops
Sales agencies
Service stations
Storage
Top and body work
Used car dealers

Types of workers
- Auto mechanic
- Bus driver
- Body and top mechanic
- Car washers
- Gasoline man
- Grease monkey
- Mechanic's helpers
- Parts man
- Painter

Service station operator
Taxi driver
Truck driver
Upholsterer

Banking and investment

Banks
Bonds, stocks
Miscellaneous

Types of workers

Active vice president
Auditor
Bank clerk
Bank teller
Bond salesman
Bookkeeper
Broker
Cashier
Credit man
Janitor
Statement clerk
Stenographer
Stock salesman

Construction

Building construction
General
Highway

Types of workers

Bookkeeper
Bricklayer
Bridge carpenter
Carpenter
Carpenter foreman
Cement finisher
Cabinet maker
Construction worker
Decorator
Electrician
Engineer
Form builder
Ground man
Helper
Joiner
Lather
Lineman
Metal worker
Maintenance man
Office worker
Painter
Paper hanger
Plasterer
Plumber
Plant operator
Pole setter
Roofer
Sub-station operator
Stenographer
Trouble shooter
Dragline operator

Entertainment

Bowling alley
Night clubs
Orchestras
Picture shows (movies)
Pool rooms

Types of workers

Box office clerks
Cashiers
Directors
Doormen
Janitors
Manager
Motion picture operator
Musicians
Owners
Ushers

Government service

City officers
County officers
State officers
Fruit inspectors
Old age relief
Postoffice
Re-employment office
Rehabilitation office
Schools

Types of workers

Bookkeepers
Border patrol
County school supt.
County treasurer
City clerk
City letter carriers
County engineer
County surveyor
County clerk
County judge
Court reporter
Constable
Deputy sheriff
District attorney
District judge
District clerk
Fireman
Fruit inspector
Highway patrolman
Jailer
Justice of the peace
Mayor
Notary public
Old age relief agent
Policeman
Postmaster
Postal clerk
Rehabilitation office
Re-employment agent
Representative
Rural carrier
Sheriff
Senator
Tax Assessor-Collector
U. S. Marshall
School caretakers
School librarians
School principals
School superintendent
Teachers

Hostelries

Apartment houses and groups
Hotels
Tourist camps
Trailer camps

Types of workers

Bookkeepers
Cashier
Chambermaids
Hostess
Housekeeper
Desk clerk
Janitor
Porter

Horticulture

Citrus
Vegetable
Combination citrus and vegetable
Flowers and shrubs
Nurseries

Types of workers

Dusters
Florist
Fruit grower
Laborers
Landscape gardener
Manager
Nurseryman
Orchardist
Owner
Pickers
Sprayers
Tree surgeon

Manufacturing ✓

Bakeries
Bottling companies
Canning plants
Creameries
(Ice under "Utilities" and "Packing and Shipping")

Types of workers

(Baking)
Baker
Cutter
Foreman.
Helpers

Kneaders
Mixers
Manager-owner
Office workers
Salesmen
Second hand
Third hand
Wrappers

(Canning)
Bookkeepers
Capper
Collector
Cooler
Exhaust man
Filler
Grader
Plant foreman
Plant mechanic
Preparer
Washer
Utility men

(Creamery)
Bookeepers
Butter maker
Helpers
Ice cream maker
Office workers
Owner-manager
Plant superintendent
Receiver
Salesman
Tester
Wrappers

Mechanical industries and shops

Blacksmith shops
General repair shops
Gunsmith and lawn mower repair shops
Machine shop
Picture framing
Plumbing
Railroad shop
Sheet metal and roofing
Shoe repair shops

Types of workers

Acetylene welder
Blacksmith
Copper smith
Electric welder
Lathe man
Machinist
Sheet metal worker
Spot welder
Stationary engineer
Tinsmith

Packing and shipping

Citrus
Vegetable
Combination or general
Refrigeration (of cars)

Types of workers

Bookkeepers
Box makers
Checkers
Dumpers
Field superintendents
Graders
Haulers
Laborers
Loaders
Labeler
Night foremen
Pickers
Picking foreman
Plant foreman
Plant mechanic
Receiving clerk
Shipping clerk
Superintendent
Truckers (floor)
Ice engineer (Vahlsing)
Other workers at icing dock

Personal service institutions

Barber shops
Beauty shops
Cleaning and pressing shops
Cotton gins
Grist mills
Laundries
Public scales
Restaurants and cafes
Undertaking parlors
Shine parlors
(Omit eating places)

Types of workers

Barbers
Beauticians
Bookkeepers
Bootblack
Cleaner
Delivery boy
Dyer
Engineer
Embalmer
Extractor
Ginner
Ironers
Laundress
Lister
Marker
Manicurist
Manager
Miller
Office workers
Presser
Sorters
Suction man
Undertakers
Weighers

Petroleum industry

Distributing (wholesale and tank)
Drilling
Engineering (?)
Production
Pipe line
Refining

Types of workers

Cable-tool driller
Collector
Driller
Derrickman
District manager
Distributor (agent)
Engineer
Field superintendent
Fireman
Gauger
Helpers
Mechanic
Pumper
Rigger
Rig mowers
Roughneck
Roustabout
Refinery workers
Tank man
Tool maker
Welders

Printing

Job printing
Publishing
Combination shops

Types of workers

Advertising man
Bank man
Bookkeeper
Caster
Compositor
Distributing agent
Editor
Linotype operator
Make-up man
Pressman
Proofreader
Reporter
Route boys
Stoneman

Professional service organizations

Abstract and title
Accounting
Dental
Engineers
Hospital
Legal
Medical
Optometry
Photography
Churches

Types of workers

Administrators
Accountants
Abstractors
Attorneys
Bookkeepers
Chiropractors
Caretakers
Dark-room operators
Dentists
Hospital superintendent
Hospital attendant
Head nurse
Janitors
Lawyer
Medical assistant
Mechanics
Minister
Nurses
Office workers
Optometrist
Pastors
Physician
Physician and surgeon
Portrait photography
Printer (photo)
Priest
Retoucher
Secretary
Surgeon
Technician
Typist

Radio shops

Sales
Repair
Sales and service

Types of workers

Repair man
Salesman
Technician
Utility man

Retail distribution

Auctioneers
Book stores
Building supplies
Drygoods and clothing
Drugs
Food, seeds, and grains
Foods (including meats, fruits, and vegetables)
Florist shops
Furniture and household goods
Hardware and implements
Ice cream
Secondhand goods
Variety

Types of workers

Bookkeeper
Butcher
Cashier
Druggist
Florist
Fruit dealer
Jeweler
Meat cutter
Office worker
Pharmacist
Proprietor
Sales clerk
Stock keeper
Store Manager
Store keeper
Delivery man
Estimators
Specialty salesmen

Tractor and farm machinery

Sales
Sales and service
Repair shops

Types of workers

- Bookkeepers
- Mechanics
- Office workers
- Salesmen

Transportation and communication

Bus lines
Express companies
Railroad offices
Trucking companies
Telephone companies
Telegraph companies
Taxicabs

Types of workers

- Car inspector
- Car repairman
- Chisel operator
- Delivery boys
- Division agent
- Express agent
- Freight agent
- General repair man
- Lineman
- Maintenance engineer
- Office supervisor
- Office workers
- Section foreman
- Section hand
- Signal maintenance man
- Station master
- Telegraph operator
- Ticket agent
- Track foreman
- Track watchman
- Traffic manager

Utility companies

Electric
Gas
Ice
Water

Types of workers

- Appliance mechanic
- Bookkeepers
- Deliveryman
- Electrical engineers
- Electricians
- Ice engineer
- Installation superintendent
- Laborers
- Lineman
- Maintenance man
- Manager (local)
- Meter readers
- Office workers
- Plant engineers
- Salesman
- Truck drivers
- Water engineers

The percentages of people engaged in these occupations in the valley, as compared with the United States, are shown in Figure 3. The distribution of persons gainfully employed in the United States as a whole is compared with that of the Rio Grande Valley.

In three classifications, namely manufacturing, trade, and domestic service, the Valley is found to be generally on a par with the country as a whole, being slightly below the national figure in manufacturing and domestic service and slightly above in trade.

The Valley has nearly twice as much agriculture in proportion to the rest of the country; on the other hand the Valley has practically no extraction of minerals. In transportation, and especially in the professional service and clerical classifications, the Valley is considerably below the national average.

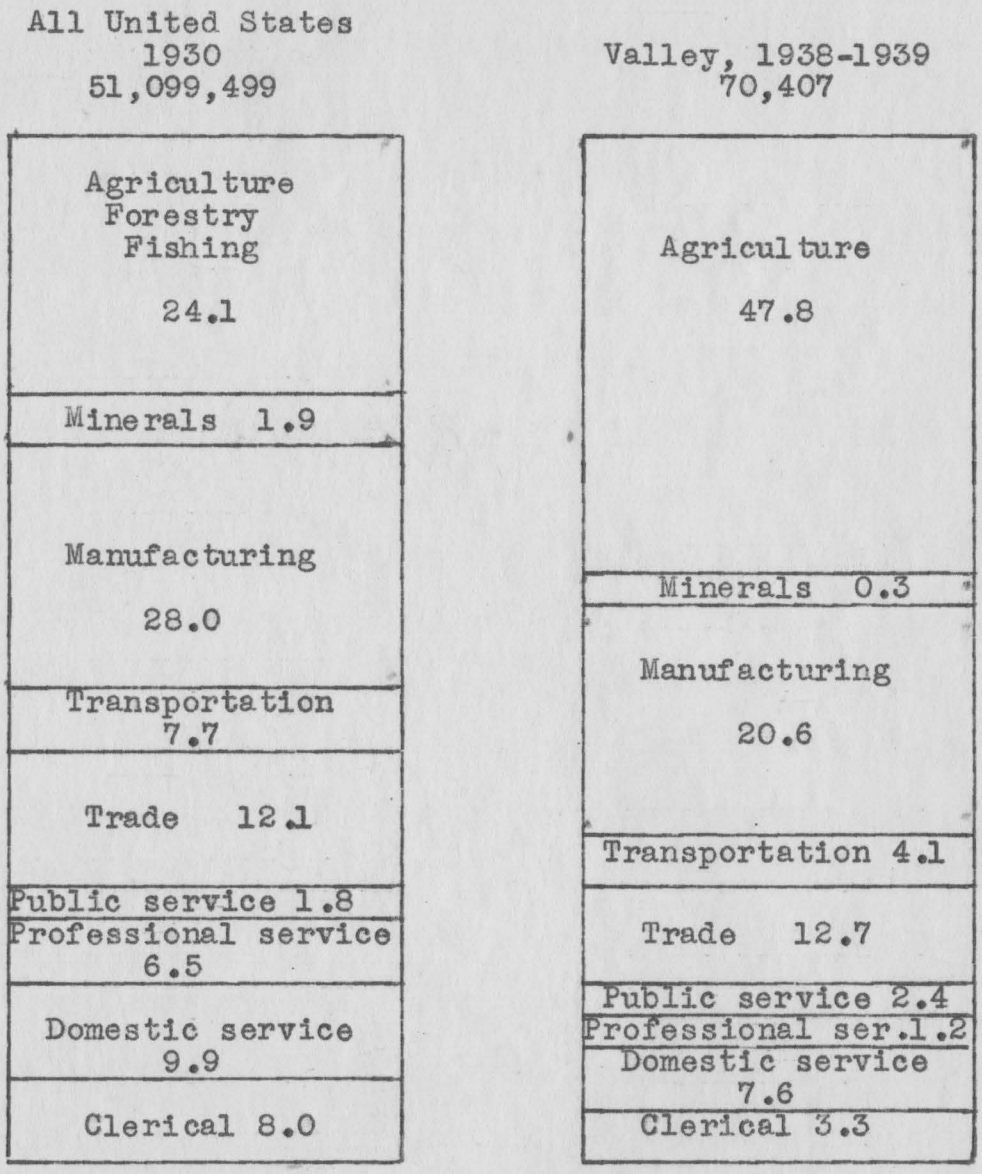


Figure 3.--PERCENTAGE DISTRIBUTION OF GAINFULLY EMPLOYED PERSONS

Table 2 gives actual totals of persons engaged in the various occupations in the Valley. This table is a summation of the classified workers of the Valley by districts.

Since this survey is limited to those occupations covered by the Smith-Hughes and George Deen Acts, the columns of chief interest in the table are domestic service, skilled and semi-skilled labor.

The table shows 4315 skilled craftsmen in the Valley and 9264 semi-skilled. Of the skilled classes, 673 are engaged in administration and supervision, 1928 in mechanical crafts, 511 in automotive industries, 1326 in the building trades, and 549 in electrical. Six percent of the workers in the Valley belong to the skilled class.

Semi-skilled workers are divided into two classes. Of these, 6,212 are working in predominately mechanical occupations and 3,052, less than half as many, in predominately manual occupations. Semi-skilled workers of the Valley make up 13.1 percent of the total employed in the area. There are 1,844 workers in domestic service, making up 2.4 percent of the total employed.

Table 2.--SUMMATION OF CLASSIFIED WORKERS BY DISTRICTS

Rio Grande Valley Districts	Workers						
					Sales		
	Farm operators	Professional	Semi-professional	Technicians	Managerial	Inside	Outside
Brownsville - -	--	--	--	--	280	633	172
Donna - - - - -	--	5	--	7	6	50	9
Edinburg (Co.)	6965	193	--	42	7	203	59
Harlingen - - -	--	226	6	61	296	591	207
La Feria - - -	--	29	--	--	10	33	1
Los Fresnos - -	--	18	--	4	12	14	--
McAllen - - - -	--	302	--	115	79	362	180
Mercedes - - -	--	60	1	7	89	176	23
Mission - - - -	--	44	--	28	14	50	21
Pharr-San Juan	--	12	--	2	6	57	4
Point Isabel -	--	19	3	2	17	20	--
Raymondville -	1288	66	3	41	118	119	8
San Benito (Co.)	5969	122	53	26	168	223	77
Weslaco - - - -	--	253	--	40	55	390	127
Edcouch-Elsa) La Joya) Santa Maria) Rio Grande City)	--	63	--	1	3	85	18
Totals - -	14,222	1412	66	376	1160	3006	906
Percent total -	21.6	2.1	0.1	0.5	1.7	4.5	1.3

Table 2.--SUMMATION OF CLASSIFIED WORKERS BY DISTRICTS
Continued

Rio Grande Valley Districts	Business		Service		
	Managerial	Clerical	Domestic	Institutional	Maintenance
Brownsville -	241	490	300	124	108
Donna - - - -	55	60	64	52	4
Edinburg - -	157	369	52	208	73
Harlingen - -	114	351	85	231	28
La Feria - -	11	28	19	33	2
Los Fresnos -	5	6	12	3	--
McAllen - - -	312	378	797	403	303
Mercedes - -	29	85	38	84	3
Mission - - -	63	108	166	88	84
Pharr-San Juan	26	36	18	30	4
Point Isabel	10	11	9	79	5
Raymondville	18	72	18	49	5
San Benito -	91	187	25	100	26
Weslaco - - -	334	517	235	280	151
Edcouch-Elsa) La Joya) Santa Maria)	59	73	6	33	5
Rio Grande City)					
Totals - -	1525	2771	1844	1797	801
Percent total -	2.3	3.5	2.4	2.7	1.05

Table 2.--SUMMATION OF CLASSIFIED WORKERS BY DISTRICTS
Continued

Rio Grande Valley Districts	Skilled craftsmen (all)					Semi-skilled		Un-skilled
	Administration Supervision	Mechanical	Automotive	Building trades	Electrical	Predominately machine	Predominately manual	All classes
Brownsville - -	29	113	64	376	123	209	420	2140
Donna - - - - -	22	64	19	37	11	34	110	1250
Edinburg - - -	107	113	54	74	36	1305	388	1682
Harlingen - - -	60	255	66	400	113	192	210	1168
La Feria - - -	13	9	10	9	8	9	49	170
Los Fresnos - -	1	4	6	6	--	8	46	231
McAllen - - - -	106	221	50	172	47	2410	350	6125
Mercedes - - -	14	74	23	37	27	104	173	1963
Mission - - - -	40	127	21	23	10	315	229	650
Pharr-San Juan	2	43	8	14	5	115	91	1572
Point Isabel -	15	386	5	16	1	3	14	19
Raymondville -	12	20	29	34	10	19	22	324
San Benito - -	47	86	49	49	59	195	314	2553
Weslaco - - - -	152	303	98	67	89	1117	508	5321
Edcouch-Elsa) La Joya) Santa Maria)	53	110	9	12	10	176	138	1110
Rio Grande City)								
Totals - - - - -	673	1928	511	1326	549	6212	3052	26,268
% replacements	1.0	2.9	0.65	1.4	0.7	9.1	4.0	36.5

Grand total 70,407

Table 3 shows the percent of turnover of the workers of the Valley, classified as in Table 2. This table is a summation of the annual turnover of workers in the Lower Rio Grande Valley by districts. The statistics given are those of the year 1938-39. The total turnover, not including unskilled labor, is 2,430.

The percentage turnover for the Valley is 9 percent, as compared with 5 percent for the United States as a whole. Of this 9 percent, one third, or 3 percent, are in the skilled and semi-skilled classifications and the remaining 6 percent are unskilled.

Table 3.--TOTAL TURNOVER OF WORKERS ANNUALLY BY DISTRICTS

Rio Grande Valley School Districts	Professional	Semi-professional	Technicians	Sales			Business	
				Managerial	Inside	Outside	Managerial	Clerical
Brownsville - -	--	--	--	8	71	12	7	43
Donna - - - - -	--	--	--	1	1	1	2	5
Edinburg - - -	10	--	4	0	26	4	5	30
Harlingen - - -	11	0	6	9	76	14	3	28
La Feria - - -	1	0	0	0	4	0	0	1
Los Fresnos - -	1	0	0	0	3	0	0	0
McAllen - - - -	15	0	11	2	47	13	9	30
Mercedes - - -	3	0	1	2	23	2	1	6
Mission - - - -	2	0	3	0	7	1	2	8
Pharr-San Juan	1	0	0	0	7	0	1	3
Port Isabel - -	1	0	0	1	3	0	0	1
Raymondsville -	3	0	4	4	15	1	1	6
San Benito - -	6	3	3	5	19	5	3	15
Weslaco - - - -	12	0	4	2	60	21	10	41
Edcouch-Elsa) La Joya) Santa Maria) Rio Grande City)	3	0	1	0	10	1	2	6
Totals - -	69	3	38	33	362	75	37	223

Table 3.--TOTAL TURNOVER OF WORKERS ANNUALLY BY DISTRICTS--Continued

Rio Grande Valley School Districts	Service			Skilled craftsmen					Semi-skilled	
	Domestic	Institutional	Maintenance	Administra'n	Mechanical	Auto	Building trades	Electrical	Machine	Manual
Brownsville - -	30	12	3	1	11	11	77	11	16	46
Donna - - - - -	6	5	0	1	6	3	8	1	3	12
Edinburg - - -	5	20	2	4	11	10	16	3	24	43
Harlingen - - -	8	23	1	2	26	12	84	10	15	23
La Feria - - -	2	3	0	1	1	2	2	1	1	5
Los Fresnos - -	1	0	0	0	0	1	1	0	1	5
McAllen - - - -	79	40	9	4	22	9	46	4	212	39
Mercedes - - -	4	8	1	1	7	4	8	2	8	18
Mission - - - -	17	9	3	2	13	4	5	1	25	26
Pharr-San Juan	2	3	0	0	4	1	3	0	9	10
Port Isabel - -	1	8	0	1	38	1	3	0	0	2
Raymondsville -	3	5	0	0	2	5	7	1	2	2
San Benito - -	3	10	1	2	9	9	10	1	16	35
Weslaco - - - -	25	28	5	6	20	18	14	8	89	16
Edcouch-Elsa, La Joya, Santa Maria, Rio Grande City	1	3	0	2	11	2	3	1	14	15
Totals - -	184	131	25	27	180	85	284	44	435	297

Grand total (not including unskilled labor) - - 2,430

Percent of total turnover - - - - - - - - - - - - 9

Table 4 gives the scholastic census of the Valley by school districts. This table shows the variety of conditions existing in the Valley.

1. The average daily attendance, all school ages, is only 72 percent of the enrollment and 55 percent of the total scholastic census.

2. The enrollment is 75 percent of the scholastic census. This leaves 25 percent who do not attend school at all.

3. Of the 75 percent who are enrolled, 28 percent are absent daily.

Table 4.--VALLEY SCHOLASTICS DATA BY DISTRICTS AND AGES, 1937-1938
(State superintendent's bi-annual report)

Districts	All school ages			14 to 18		H. S. grad. enter college
	Enumer schol.	En-rolled	A.D.A.	In school	Out school	
Alton - - - -	242	191	121	4	62	--
Brownsville -	5,699	4,613	3,528	848	706	40
Cameron County	1,959	1,173	874	143	461	--
Donna - - - -	2,658	1,891	1,367	327	563	16
Edcouch-Elsa	1,063	892	591	87	213	6
Edinburg - -	4,653	3,686	2,608	561	971	35
El Jardin - -	467	290	217	41	113	--
Harlingen - -	3,646	3,313	2,570	619	597	40
Hidalgo Co. -	1,104	829	499	56	362	--
Hidalgo - - -	783	514	375	35	221	--
Highland - -	224	195	123	18	50	--
La Feria - -	1,278	1,029	795	200	201	11
Lasara - - -	359	261	181	26	90	--
Los Fresnos -	876	594	429	75	202	2
Los Indios -	343	201	140	18	85	--
Lyford - - -	1,029	797	458	117	325	3
McAllen - - -	3,463	3,143	2,314	657	472	34
Mercedes - -	2,568	1,791	1,346	315	512	16
Mission - - -	2,049	1,560	1,236	339	350	24
Olmito - - -	236	171	116	15	55	--
Pharr-San Juan	3,563	2,494	1,824	402	784	24
Point Isabel	487	393	316	56	94	--
Progreso - -	150	112	72	12	36	--
Rangerville -	372	87	64	--	92	--
Raymondville	1,375	1,367	956	260	168	13
Rio Grande City	1,584	1,137	738	193	360	13
Rio Hondo - -	1,137	948	678	127	220	4
San Benito -	3,048	2,545	1,970	498	550	30
Santa Margarita	501	372	257	71	23	3
Santa Maria -	348	262	175	27	149	--

Table 4.--VALLEY SCHOLASTICS DATA BY DISTRICTS AND AGES, 1937-1938--Continued
(State superintendent's bi-annual report)

Districts	Supt.'s report			Scholastic census		
	6 to 9	10 to 13	14 to 18	6 to 9	10 to 13	14 to 18
Alton - - - -	79	53	4	110	88	66
Brownsville -	1373	1656	890	1999	2082	1660
Cameron County	535	431	143	711	688	693
Donna - - - -	615	629	342	944	952	896
Edcouch-Elsa	328	295	99	413	440	300
Edinburg - -	1295	1247	590	1783	1744	1533
El Jardin - -	107	122	41	165	160	154
Harlingen - -	1145	1085	640	1350	1305	1218
Hidalgo Co. -	333	289	57	413	444	420
Hidalgo - - -	281	187	35	270	278	246
Highland - -	83	71	19	86	71	68
La Feria - -	329	276	210	507	449	401
Lasara - - -	93	94	28	154	133	116
Los Fresnos -	213	219	78	330	357	277
Los Indios -	82	88	18	142	129	103
Lyford - - -	253	225	119	508	504	440
McAllen - - -	977	1083	682	1245	1275	1129
Mercedes - -	569	691	328	952	988	827
Mission - - -	460	544	357	799	797	689
Olmito - - -	73	62	15	98	94	7
Pharr-San Juan	891	825	424	1406	1155	1186
Point Isabel	131	147	68	195	190	150
Progreso - -	42	40	11	70	56	48
Rangerville -	45	37	--	91	97	92
Raymondville	402	416	273	522	582	425
Rio Grande City	413	379	209	559	612	530
Rio Hondo - -	356	317	135	406	404	347
San Benito -	806	893	522	1147	1133	1048
Santa Margarita	105	125	74	186	156	175
Santa Maria -	92	83	28	132	141	94

Table 4.--VALLEY SCHOLASTICS DATA BY DISTRICTS AND AGES, 1937-38--Continued
(State superintendent's bi-annual report)

Districts	All school ages			14 to 18		H. S. grad. enter college
	Enumer schol.	En-rolled	A.D.A.	In school	Out school	
Santa Rosa -	680	506	387	100	100	5
Sharyland - -	512	423	309	78	76	4
Stuart Place	435	302	210	49	90	3
Tabasco - - -	1098	926	725	147	179	1
Weslaco - - -	2625	2303	1493	361	490	36
Willacy Co. -	1080	549	406	44	362	--
Willamer - -	215	112	68	17	59	--
Wilson - - -	283	285	213	45	52	2
Grand totals	55,872	42,257	30,747	6,988	10,501	366

Table 4.--VALLEY SCHOLASTICS DATA BY DISTRICTS AND AGES, 1937-1938--Continued
(State superintendent's bi-annual report)

Districts	Supt.'s report			Scholastic census		
	6 to 9	10 to 13	14 to 18	6 to 9	10 to 13	14 to 18
Santa Rosa -	197	172	109	213	235	200
Sharyland - -	153	157	80	179	193	154
Stuart Place	84	107	52	166	166	139
Tabasco - - -	332	333	153	383	372	326
Weslaco - - -	680	701	373	976	999	851
Willacy Co. -	251	212	45	488	475	392
Willamer - -	31	36	117	80	72	72
Wilson - - -	87	105	47	118	116	103
Grand totals	14,321	14,432	7,315	20,296	20,132	17,485

The percent in school and out in various ages groups are shown on Figure 4. This graph shows the age grouping and the in-school and out-of-school percentages in each group of persons of school age. The significant fact of this study is that 58.2 percent of those of the 14 to 17 years group are out of school.

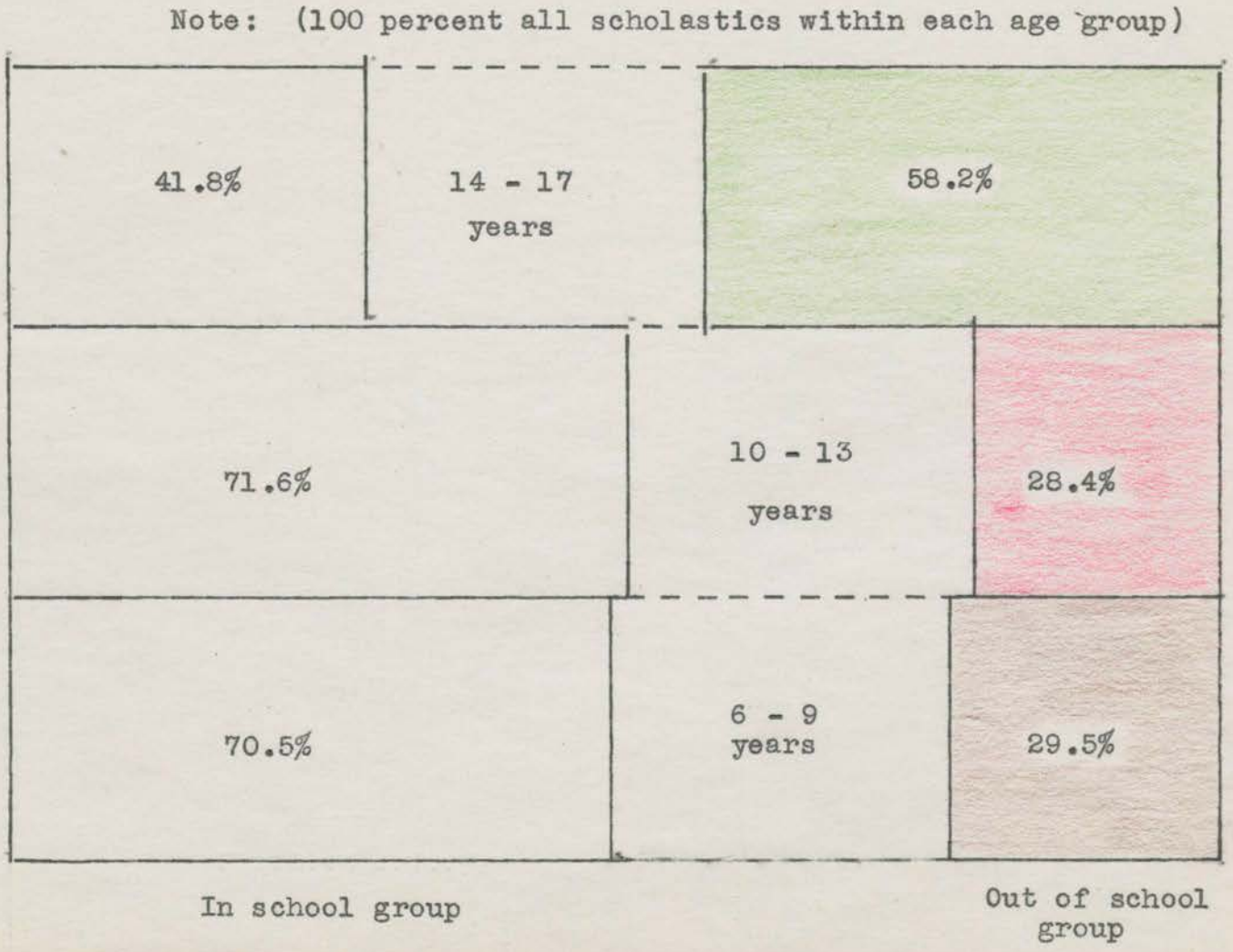


Figure 4.--AGE GROUPINGS OF THE VALLEY SCHOLASTICS SHOWING IN SCHOOL AND OUT OF SCHOOL PERCENTAGES IN EACH AGE GROUP

In the following map the in-school, out-of-school, and the total scholastic census are given. This map, Figure 5, shows the in-school and out-of-school pupils of 14 to 18 years of age, and the total scholastic census by districts.

1. The figures in the circle, as in Hidgego Co. Common (56) , are pupils 14 to 18 years of age in school.

2. The other figure (418) gives the total scholastics 14 to 18 years.

3. The out-of-school group may be found by subtracting 56 from 418 which leaves 362 of this age group out of school.

4. The last figure (1104) shows the total scholastics census.

This is done for each district. Then by using certain points as centers, circles with radii of 10, 15, and 20 miles were drawn and the totals for each were found. The results of these findings are shown in Table 5.

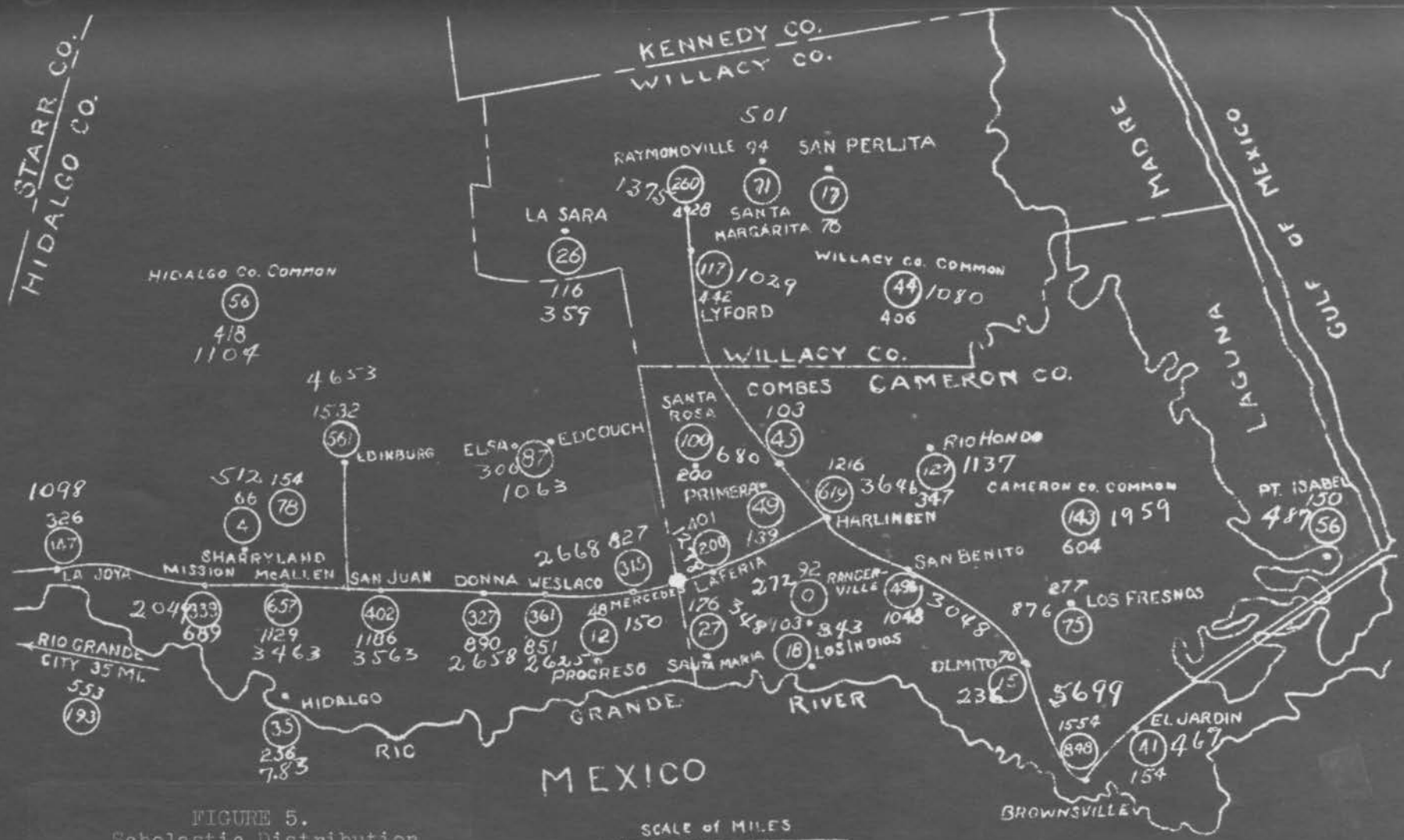


FIGURE 5.
Scholastic Distribution
by School Districts

Table 5 shows the number in school and out of school between the ages of 14 and 18 and the total scholastic census within radii of 10, 15, and 20 miles of certain centers. These seven points were chosen on account of their geographical location.

The findings of this chapter will be discussed in detail in the following chapter. They will be discussed in the same order as given in this chapter.

Table 5.--NUMBER IN SCHOOL AND OUT OF SCHOOL BETWEEN THE AGES OF 14 AND 18 AND THE TOTAL SCHOLASTIC CENSUS WITH RADII OF 10, 15, AND 20 MILES OF CERTAIN CENTERS

Location	Radius--10 miles			Radius--15 miles			Radius--20 miles		
	In school	Out school	Total	In school	Out school	Total	In school	Out school	Total
County Line -	1,728	2,233	8,264	2,331	3,173	15,977	4,651	7,028	21,706
Edinburg - -	1,702	2,365	8,628	3,175	4,252	20,183	8,660	8,562	22,573
Harlingen - -	1,625	1,152	10,371	2,462	3,072	13,170	4,630	6,109	20,075
McAllen --- -	2,076	2,936	10,370	2,606	4,040	18,677	3,381	5,324	23,469
Mercedes - -	1,342	2,051	7,157	2,513	3,880	10,803	4,990	7,392	15,429
San Benito -	1,389	1,802	8,682	1,934	2,915	16,687	3,645	5,156	26,646
Weslaco - - -	1,102	1,814	8,063	1,831	3,049	15,308	4,935	7,305	27,941

Chapter V

DISCUSSION OF FINDINGS

The findings of the previous chapter, which are listed in maps, tables, and charts, show the employment and educational data for the Valley as it will be used in determining the need for vocational education.

The peculiar location of the Valley and the semi-tropical climate make this a unique area. It is an irrigated fruit and vegetable growing area. With Mexico on the south, the Gulf of Mexico on the east, and the arid region on the north and west, the Valley is different from the rest of the state. By referring to Figure 2, it will be seen that some of the towns of the Valley are so close together that there is practically no rural section between them. This makes the group of towns essentially a single city. The interests are so closely united that the Valley may well be compared to a large city with many small suburbs. The citrus growing problem is one which is of common interest and must naturally be considered for the Valley as a whole. Vegetable farming is an industry which is considered as a Valley problem. Even the police must closely cooperate in their work. Practically all roads in the Valley are

paved and the main highway through the Valley is referred to as the "main street" of the Valley. The most densely settled area along that main street is that part from Mission to Harlenger and extending several miles on either side of this road.

In another respect also, the Valley problems are considered as a whole. There are twenty-three high schools, each with typical college preparatory programs. (Table 4.) This shows conclusively that the interest of educators is concerned, at present, with the college-bound group and not with the group who are to enter immediately into the various fields of employment in the skilled or semi-skilled occupations. This is further shown by the fact that only three courses exist for vocational training in this area. La Joya has a general building trades course, and both Edinburg and Weslaco have courses in auto mechanics.

The Valley is one big community in all phases of government and business, and it attacks its problem as one community. Since this is true, the consideration which is given to the matter of vocational education should become a Valley-wide problem.

The population of the Valley is distributed in the three counties in the following order: Hidalgo County leads in the population with 97,500; Cameron County is next with 91,300, and then Willacy with 19,500.

(See Table 1) This shows the concentration of the population in the area where the towns are most closely located.

Racially, the Valley population is different from that of the state as a whole. The Valley has a population 52 percent Mexican, 47 percent white, and 1 percent Negro. The state as a whole has a population 11.77 percent Mexican, 73.5 percent white, and 14.7 percent Negro. (See Figure 4) These figures show that there is practically no Negro problem in the Valley. There is practically an equal number of Mexican and white persons. This situation makes a difficult problem so far as the occupational conditions are concerned. In some types of employment only Mexicans are used; in others only the white people are employed, while in still others both Mexican and white people are employed. These conditions raise a very grave employment problem, namely, what should be done to better equip these groups for the employment in which they are to enter?

The occupations of the Valley are many and varied. The occupations, however, have about the same proportions as those of the United States as a whole (Figure 4). If the occupational list is studied, it will be seen that the occupations and the grouping of workers in each are much the same as those found in other small towns in the rural agricultural sections of the United States and of the state of Texas.

When employment data are taken into consideration, it is found that the Valley is quite similar to the United States in many respects, while in some respects there are differences. This is particularly true of the mineral extraction and the professional service which rate much lower than for the United States (Figure 5). The Valley workers, when classified under the various jobs, show these divisions (See Table 2, Classification of workers): The people who are engaged in selling are divided into three general classifications: owner or manager, inside, and outside. The managerial sales accounts for 1,160 sales people. The inside sales group has 3,006 employees and there are 907 outside sales people. Service has been divided into domestic, institutional, and maintenance (Table 2). These figures are significant in that there are 1,844 domestic service people and 1,797 institutional service people. These people make up those groups which do the household servant work; the beauticians, and the janitor work are in the various institutions.

Much of the data found in this survey will not enter into the final discussions. Out of all the data gathered in this investigation only that dealing with the service and the skilled and semi-skilled workers will be used. This study is made for the purpose of finding the vocational training needs for the Valley, and is based

on the courses of training which are provided for by the Smith-Hughes and George-Dean Acts.

The total number employed persons and the annual turn-over in employment within these groups are very significant parts of this study. These occupations have been so grouped, that wherever a man was found doing a specific kind of work he was placed under the classification to which he belonged according to his payroll job. For example, within the packing industry there was found an automobile mechanic; he was not classed under packing, but under automobile mechanics.

In the classification of skilled workers there were found a total of 4,999. These workers were distributed as follows: Owners and managers, 675; machine shop workers, 511; building tradesmen, 1,336; and electrical workers, 549 (Table 2).. The semi-skilled workers are classed in two groups, those who do machine work and those who do manual labor. The semi-skilled machine workers number 6,212, and the semi-skilled manual laborers, 3,052 (Table 2)..

These skilled and semi-skilled workers are distributed in every "nick and cranny" of the Valley. They range in various-sized groups; in Fort Isabel there is only one electrical worker, while in Harlengen there are 113. In the automobile mechanical work, San Juan has five and Weslaco has 98. The number of building

tradesmen in Los Fresnos is 6 and in Harlingen there are 400 (Table 2). These data show that the labor is not concentrated in any one town or part of the Valley.

Most of the places where these men work are small establishments. In many cases a garage has a single mechanic who must do all the repair work from one bumper to the other. These men are not highly skilled technicians but general mechanics, and many are only semi-skilled in their work. The same is true for all types of work.

This study must not be too idealistic, but it must be realistic and look at the jobs and the men where they are and under the conditions which exist. It is therefore important to note from the summation of classified workers (Table 2) that from Mission to Brownsville and up to Raymondville and all other points between, the workers are distributed in a way which makes it impossible to find any center which would justify a training program when considered alone (see map).

The purpose of providing vocational training is to prepare people to enter jobs and become better workers in those jobs. The basis for finding employment possibilities is to study data which will show the annual turnover or new workers needed. The problem should not be looked at too narrowly; it cannot be hoped to place as many workers in jobs as the total turnover. Some men may move from place to place and yet be classed as turnover

The Valley has a turnover of 9 percent (see Table 3) as compared with the United States' five percent (United States Census 1930). The large turnover in the Valley is caused by the rapid growth of this area. There are several towns--Weslaco, McAllen, Pharr, and others--which have from 1,000 to 10,000 population, which were not in existence in 1900 (United States Census, 1900). This Valley is growing rapidly and it is only reasonable to believe that it will continue to grow for many years. (United States Census 1900-30)

When a further look is taken at the turnover, we find a very interesting situation.

In automobile mechanic workers there is an annual turnover of 85. This turnover is distributed in a "crazy quilt" manner. Port Isabel, Los Fresnos, Pharr, have an annual turnover of only 1; La Joya has 2, and Mission has 4. The largest turnover found anywhere is Harlenger with only 12. (Table 3) When the total turnover of 85 is found it is evident that there is a need for vocational training for automobile mechanics. This training cannot be justified for any one town but is justifiable for the Valley as a whole.

In the machine shop workers, the annual turnover is 180. These are scattered in every corner of the Valley. The total for Edcouch, Elsa, La Joya, Santa Maria, Rio Grande City, is only 11. Raymondsville has 2,

Pharr 4, LaFeria 1, and so the distribution goes. Therefore, here again there is a need for vocational training, but again it must be said that the Valley must be considered as a unit for this training.

The building tradesmen have an annual turnover of 284. This turnover is scattered over the Valley in small numbers, just as automobile mechanics and machine shop workers. Los Fresnos has 1, La Feria 2, Donna 8, Mission 5, Port Isabel 3. Here again is found a need for vocational training. Again the need is Valley wide.

The domestic service is divided into two groups: those of a public, and those of a private nature. In the first group beauty culture is classed. On the basis of this classification and the annual turnover in this group there is training needed for cosmetology (Table 2). The private domestic service of the Valley has no training except what is given on the job. The household service is principally done by Mexican girls, and there is an annual turnover of 184 out of 1,844 employed (Table 3), which indicates a need for training skilled and semi-skilled workers.

In every classified type of skilled or semi-skilled work surveyed it was found that there was a need for vocational training. It will also be found that the need is not for any one town or area but the Valley as a whole (See Table 3).

These data show that certain jobs have sufficient turnover to justify vocational courses for training workers for employment in them.

The state of Texas will give vocational aid to any course set up in accordance with the state plan, where there are employment possibilities for a minimum of ten in a given field. Since these jobs are widely distributed throughout the Valley, it is impracticable to train one or two in each locality. The major Valley problems are considered for the whole area; and the problem of vocational education should also be considered for the Valley as a whole. It is evident from this study that this training can be done better in a centralized vocational school.

On the basis of the occupational employment (Tables 2 and 3) and the annual turnover in these payroll jobs, there is a need for training in the following fields: domestic and public service, machine shop, automobile mechanics, building trades, and electricity.

After having made a study of the occupational situation in the Valley and having found these facts regarding employment, certain recommendations for a plan for vocational training seem to be justifiable.

In this survey a study has been made to find what type of program will meet the needs for vocational education for the Lower Rio Grande Valley of Texas.

Before making a definite decision the data for the scholastic information should be summarized. There are 55,872 (Table 4), children of school age within this region. Only 55 percent of the children of school age are enrolled in school. (Table 4) The average daily attendance of those enrolled is only 75 percent. These figures are very significant. For some reason the schools are not meeting the needs, especially for children above 14 years of age (See Figure 4).

After having looked at the scholastic conditions within the area, one is lead to ask the question,

> Why is it that the Valley seems to be so closely connected and working for the common good in the affairs of business and government and so unorganized in the matter of training that group of children who will never go to college?

The needs for education of whatever kind is to prepare these children to enter employment. Any education which does this is vocational in the sense that it prepares for employment. Those who leave school at the age of 14 and who do not attend school after that age account for 58.2 percent of the total for this group (Figure 4).

The courses offered in the 23 high schools are college preparatory. Since only 15 percent of those who complete high school ever go to college, why not give vocational education to the other 85 percent? From the writer's own school, only one person, Miss Michelo Chapa, has graduated from college since 1926.

Just as the need for employment has shown that the jobs are distributed in every corner of the Valley, so are the children (Table 4). The need is found to be another of the Valley-wide problems from the standpoint of the pupil and the citizenry.

It is impractical to set up a training program for any one town for several reasons:

First, the cost could not be justified.

Second, a vocational school could not be justified on basis of employment possibilities (Table 2).

Third, sufficient number of possible trainees are not available (Table 4).

Fourth, the field would soon be over-run with those coming from such schools.

However, some form of vocational training is essential for the Valley and particularly for the group who will not go to college.

A study of the distribution of the school census has been made to find where the greatest group is centered (See Table 5). Seven geographical locations (Figure 5) were made, and after studying the number of children in each of these areas, certain facts were found. The "Main Street" of the Valley is naturally where the population is centered. When a look is taken at the map (Table 5) the eye immediately sees that the scholastic population is greatest in that area from McAllen to

Harlenger, with the central point being about that point on the "Main street" on the Hidalgo Cameron County line. A more careful study of these figures shows that within a radius of ten miles of this point there are 1,728 children from 14 to 18 years of age in school and 2,233 out of school. The total of 8,264 children were found within 10 miles.

A study of the location table (Figure 5) shows that wherever a center is chosen and radii drawn from that point a great number of children are found, both in and out of school. These facts indicate that any center might be practical for giving some kind of occupational training, if only the number of children is taken into consideration.

In choosing a possible training center a great number of things must be taken into consideration. The first thing to consider is the accessibility to all parts of the Valley. For example, if Brownsville, Mission, Raymondsville, or Edinburg should be chosen, none of them could be accessible to the entire Valley. (See Figure 1) They are not centrally located.

The roads within an area should also be considered. A point must be selected where roads are as directly connected with every part of the Valley as possible. Since all the present school districts already have bus routs coming many miles, this involves no new

problem. Some central point will make this possible. Pupils can be transported from every direction, thereby eliminating long drives fur busses. After having looked at all the possible locations, the point on the "Main street" at Hidalgo-Cameron county lines seems the point which should be selected. It has the roads, the power lines, gas lines, and telephone lines. It is accessible to all parts of the Valley and is centrally located (See Figure 1).

In order to get the desired results in any kind of school work, the school should be large enough to have a complete organization to provide for athletic and physical training. It should have proper supervision and adequately trained instructors with school equipment sufficient to do the work in a manner that will give results comparable to those found in similar institutions. This can be done in a centralized vocational school. After having studied the occupational data and the demands for employment, it is evident that a centralized vocational school should be established for the entire Valley now, and to provide for the growth of the Valley. It must not be confined to grounds which are inadequate in size to provide for future growth.

There are new phases of vocational education which will possibly become a part of this school. Aviation and all its phases call for more land. Farming and farm

mechanics call for large tracts of land. Therefore, it is not advisable to locate this school within any town.

When considered from the standpoint of the Valley, we find sufficient turnover and training possibilities in the following fields.

1. Automobile mechanics.
2. Machine shop workers.
3. Building trades workers.
4. Electrical workers.
5. Cosmetology.
6. Household service.

The automobile mechanics course should be of such content to train those entering it to enter into employment in the Valley and under the conditions which are found here. It has been shown before in this study that these men are not all highly skilled; on the contrary, many of them must work where the duties are of a general nature. Training is needed, therefore, which will give a good rounded knowledge instead of a highly skilled course. A program of this type has been checked with Ben Brandt, owner of Brandt's Garages of Mission, Texas, and Louis Boggas, owner of Boggas' Motor Company of Harlenger. These men have agreed that the type of course suggested above is the one which is needed.

In the machine shop the work is of a general nature, covering almost every kind of work, welding, machine-lathe, forging, tractor repair, stationary engine repair, oil field equipment repair, and general farm

machinery repairs. It is here again that a general machine shop course should be offered giving a wide variety of experiences in this field. This suggested outline for a course has been checked and approved by Jack Decker, Jr., Decker's Machine Shop, Mission, and Mr. Robinson, owner of Robinson's Machine Shop of McAllen.

In the building trades the carpenters in many jobs do the work from putting in the foundation to hanging the paper. In some cases they even do their painting. The trade is not made up of highly skilled men, but, just as in the automobile and machine shop, their work is of a general rather than highly skilled nature. Here again the need is for a general building trades course. This recommendation has been checked and approved by J. E. Walsh of Walsh Lumber and Contracting Company of Mission, and Ben Lapham, planing mill owner of McAllen, Texas.

The same condition is found in the electrical field. The electricians are not the highly skilled specialists as found in many places. There is, however, more of a division of the work than in some fields. Here the need is for motor men, house wire men whose work is general in nature, refrigeration, and radio men. This course as recommended is to cover these three fields. This outline has been checked by Claude Stermer of Mission, and W. M. Morgan, of McAllen.

The beauty culture work is of a more highly trained type, but here again the girls must be able to set hair, give a permanent wave, cut hair, give facials, and do a variety of work.

The need is found again for a general course rather than a highly specialized one. The household service work covers every phase of the home work, child-care, cooking, planning meals, purchasing groceries, cleaning, and general housekeeping.

It is found again that the work is not of a highly skilled nature but requires a great deal of information in a variety of home duties. This course like the others suggested should be of a general nature. This has been approved by Mrs. H. E. Butt of Harlingen and Evelyn Neilson of La Joya.

The following courses are recommended for the Valley Vocational School:

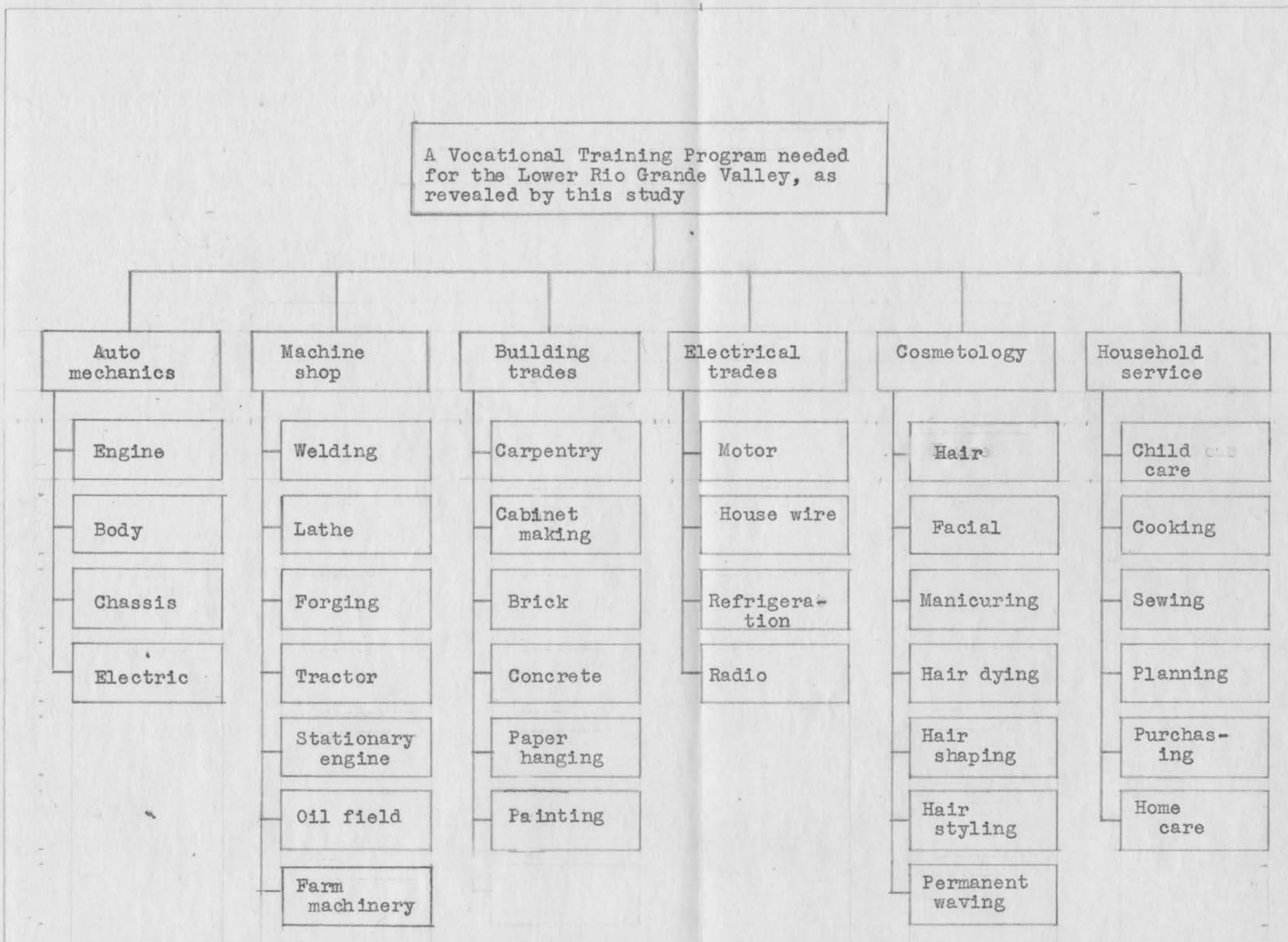
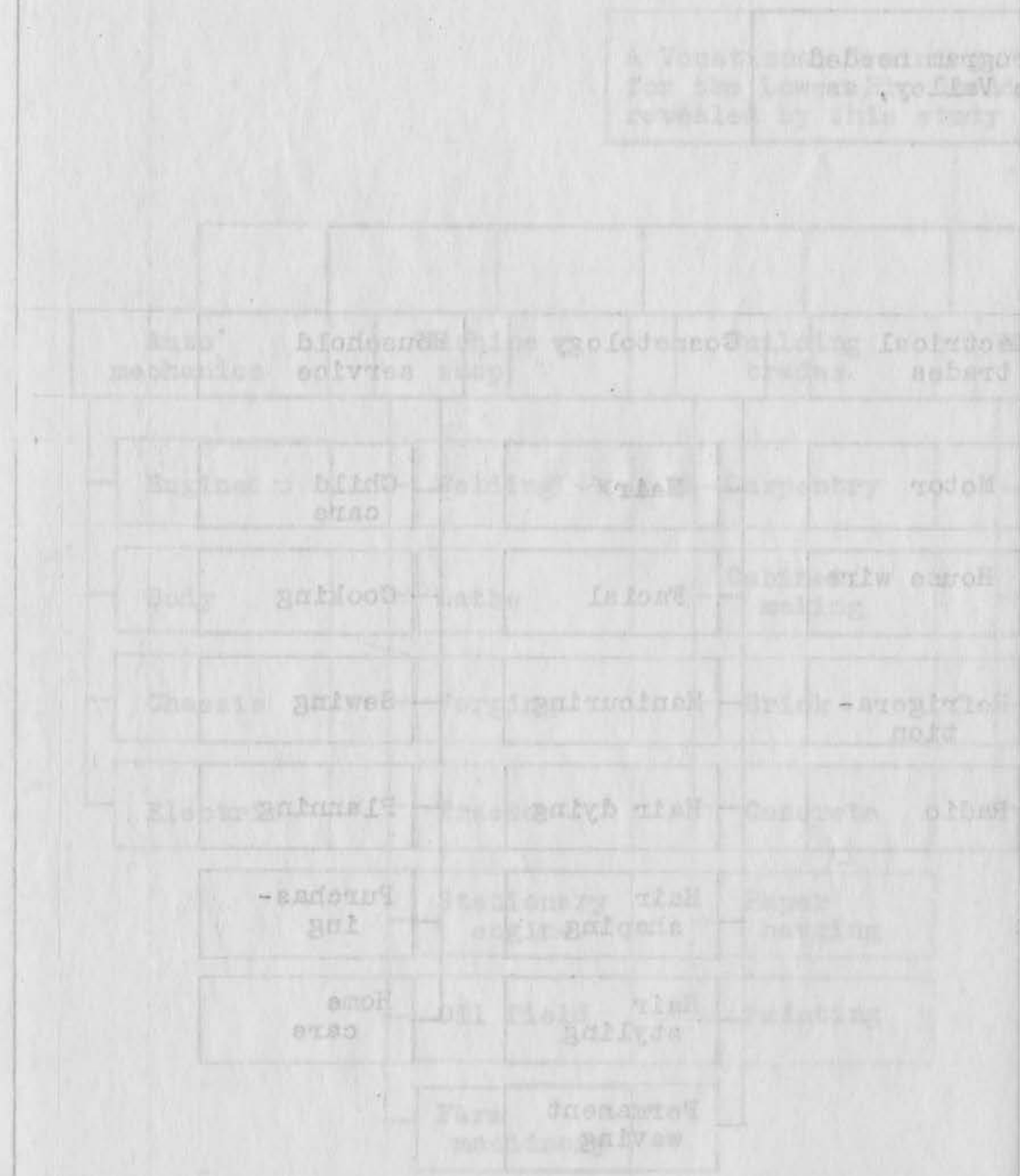


Figure 6.--A SCHEME OF COURSES FOR THE PROPOSED VOCATIONAL SCHOOL.



The trades and Industrial Teachers of the state have prepared reservoir courses of study for each of the courses which are taught in the state. These courses were prepared under the direction of the state department of vocational education. The writer recommends that these courses of study be used as the basis for the courses in the vocational school for the valley. A copy of the mill cabinet course is included in the appendix for the reader's inspection. With this course of study is found a student's progress record chart which is to be used in connection with the course of study.

It is further recommended that the training in this Valley Vocational School be confined to the last two years of high school for those boys and girls who have reached the age of sixteen and are capable of profiting by the training, regardless of educational qualifications.

The writer realizes some limitation of this survey. The findings have not been complete in some cases, while in others certain essential information may have been left out. He feels, however, that this survey has been complete enough to justify the recommendations which have been made.

Chapter VI

SUMMARY

The present study is an investigation of the specific needs for vocational education in the area known as the Lower Rio Grande Valley of Texas. This Valley is an irrigated citrus and vegetable area with Mexico on the south, the Gulf of Mexico on the east, and an arid ranch country on the north and west practically isolating the area from the rest of the State.

There are about 40 towns in the Valley up to 30,000 in population. There are twenty-three accredited high schools with college preparatory courses. Only three vocational courses are offered in the Valley, a course in auto mechanics at Edinburg and at Weslaco, and a general building trades course at La Joya.

The problem.--The question to be answered is: What plan of vocational education will meet the needs of the Lower Rio Grande Valley of Texas? Subordinate questions have been:

1. What are the needs for Vocational Education in the Lower Rio Grande Valley?
2. What agencies already exist which help to meet these needs?
3. What needs still exist in this area which should be met by new classes?

4. What plans are in use elsewhere to meet the needs similar to those of the Valley?

Materials and methods.--A list of occupations was needed to determine the type of work carried on in the Valley and the number of workers engaged in each type. A tentative list was obtained from the Industrial Classification and codes for use in public employment offices. This list was supplemented by information obtained from the chamber of commerce and by personal survey.

The survey forms were devised by three members of the State Department of Education, the Superintendent of Schools of Weslaco, and the writer.

The first form was used for listing the trades and occupations of all the firms interviewed.

In the survey forms the workers were classified as journeyman, skilled apprentices or semi-skilled workers, and helpers or un-skilled workers.

The second form gave space for the answer to ten questions pertaining to race, age, wages, and training of workers, the number of new workers needed each year, and the kind of pre-employment training desired by the employers.

The third form was in the nature of a questionnaire which listed nine specific questions covering the possibilities for advancing from the lower into the skilled-worker class, and the training necessary or helpful to employees in making this advancement.

The survey committee composed of two or more people from each school district made a census of the business establishments in the area and gathered information from interviews with the employers. The three forms mentioned above were used for recording this information. The committee surveyed eighteen of the twenty-three school districts.

The writer was held wholly responsible for the completion of the survey in La Joya, Mission, Pharr, Alamo, Edinburg, and Weslaco school districts. He was also responsible for the final collection of data for the entire area.

Certain scholastic data taken from the reports of the various school superintendents were tabulated and used in finding the number of possible trainees. Such data were also used in determining a possible training center for vocational education for the Valley.

Seven points were considered as possible training centers. The method of determining the most desirable point will be explained in connection with a summary of the findings.

Summary of the findings

A map of the Valley was prepared showing the three counties which were surveyed. Population trends over a ten-year period were secured from the census reports for the three counties. The total population for

1938 was 208,300, as compared to a total for 1930 of 165,043.

The difference in apportionment of population by races for the Valley as compared with the state showed that the Valley had 52 percent Latin Americans, 47 percent Anglo-Americans, and one percent colored, as compared with the state which has 12 percent Latin-Americans, 73 percent Anglo-Americans, and 15 percent colored.

The survey of the Valley as to pay-roll jobs showed a wide variety of occupations. As compared with the United States as a whole, the occupational groups of the Valley are more definitely agricultural, this including 48 percent of all employed persons, as compared with 24 percent for the United States. In the other types of employment the Valley is approximately on an equal basis with the rest of the country.

The survey did not include agriculture, since it was evident that vocational training was needed for agriculture.

The survey found 70,407 employees distributed throughout the Valley in every kind of employment, ranging from as low as one person employed in an occupation in one district to as high as 152 in the same occupation in another district. The pay-roll jobs were distributed throughout the Valley with no labor concentration in one point.

The annual turn-over in the pay-roll job was 9 percent for the Valley as compared with 5 percent for the United States. The grand total of the annual turn-over for the Valley was 2,430--not including the unskilled labor. This turn-over was distributed throughout the Valley in a closely uniform manner.

Limiting the occupations to those provided for in the Smith-Hughes and George-Dean Acts, the turn-overs for the following pay-roll jobs were used in making the recommendations for a program for vocational training for the Valley as a whole:

Household service and beauticians - 184
Institutional service - - - - - - - 131
Machine shop workers - - - - - - - 180
Automobile mechanics - - - - - - - 85
Building tradesmen - - - - - - - - 284
Electricians - - - - - - - - - - - 44

In determining the needs from the scholastic standpoint a study was made of the superintendents' reports. These reports showed 55,872 children of school age, only 75 percent of which were enrolled in school. Of the 75 percent who were enrolled, 28 percent were absent daily. In the age group from 14 to 18 only 41.8 percent are in school.

In selecting a possible training center, seven points were chosen and the number of children counted in certain radii of these centers. This shows sufficient trainees within distances easily accessible to the point selected.

Discussions of findings.--The Valley is a big community and considers its problems as a whole in business and government. In the consideration for vocational training it should also be considered a Valley problem.

The workers employed in the various occupations do work which is of a general nature, rather than highly skilled in nature.

The training should be for these jobs as they are and where they are found.

The state will give vocational aid to classes which are set up with a minimum of pupils.

The following occupations have sufficient turnover to justify classes of ten or more:

Automobile mechanics
Machine shop workers
Building trades workers
Electrical workers
Cosmetology
Household service

A centralized school giving these courses, with others to make a complete program, is recommended for the last two years of high school and for those persons 16 or more years old regardless of education qualifications.

The courses selected have been checked and approved by two leading men or women in each field recommended.

In selecting a place for a centralized school the following things were considered:

1. Central location
2. Accessibility to all parts of the Valley.
3. The kind of roads.
4. Availability of gas, electricity, phone, water, sufficient land.
5. Elimination of factional opposition.

After having considered these, the point for the main highway at the Hidalgo-Cameron County line was selected as the best location. (See map on following page.)

Proposed Location for
Valley Vocational School

APPENDIX

Appendix A

LETTERS

COPY

August 23, 1938

Mr. James R. D. Eddy
Austin, Texas

My dear Mr. Eddy:

For two or three years, we have been discussing the possibilities of a Valley wide Vocational school and the interest has steadily grown. It is impossible for any one school district to offer these courses as they should be offered but if we had a central school with adequate funds, the youth of the Valley would have a real chance for training for vocational work.

A committee from the Valley is planning to see you in Austin the last of the week to solicit your aid in working out plans for a survey of the Valley to determine the needs along these lines and for setting up such a school if it seems feasible. The purpose of my letter is to express my belief that such a school is badly needed in the Valley and to thank you for any consideration you may show our committee.

I think our Mr. Edwards will come as a member of the committee. I have asked him to talk over our local situation with you as I cannot come to Austin at this time.

Cordially,

S. D. Hendrix, Sup't. of Schools

COPY

July 19, 1939

Mr. H. S. Edwards
412 South Hawes Street
Fort Collins, Colorado

Dear Mr. Edwards

Dr. Woods has referred to me your letter for answer.

I am very glad to say that the State Department of Education, through its State Board for Vocational Education, heartily endorses the plan of using regional vocational schools for training the youth of our State to enter upon useful employment.

I hope that you are having a very pleasant summer and that you are enjoying your work.

Yours very truly

James R. D. Eddy, Director
Industrial Education

JE:lgm

COPY

March 10, 1939

Mr. Hamp Edwards
LaJoya, Texas

Dear Hamp:-

Your good letter and the Mill Cabinetmaking Instruction Sheets for your part in Block I were received today, and I thank the very busy man for them, too, but my memory and the records also indicate that you were also assigned and assumed the job of working up Block V, which is the Upholstering block. Evidently, this is an oversight, and I will appreciate it very much if you can do these up for me in the very near future so that I can complete my part of the job.

Your reference to the Mission, Alamo, Pharr and Weslaco parts in the Valley Survey which so far, have not been completed, I wish to state that I would like to have these at the earliest convenience of these men so that I can run my totals and we can begin to do something on getting the committee together to work on the Valley situation.

Please get in touch with Mr. McConnell and get him to complete the Weslaco survey, as he is the slowest one of the bunch down there. He wrote me some time ago that he would send the completed material to me at once then, and yet I have not received it to this day.

I will surely be happy to receive to Mission survey, if for no other reason, because of the fact that Hugh Proctor showed no interest in it at all, and I made him do what little he did on it.

Thanking you for your interests in me and what I am trying to do to get some of this work behind me, I am

Sincerely yours,

_____

James E. Hill, Itinerant Teacher Trainer
Bureau of Industrial Teacher Training
University of Texas
Austin, Texas

COPY

Fort Collins, Colorado
July 26, 1939

Mr. Hamp Edwards,
Mission, Texas

Dear Mr. Edwards:

The plan for a vocational school in the lower Rio Grande Valley, to serve the Counties of Hidalgo, Cameron and Willacy, which you have explained to me seems to be a very commendable program and worthy of serious consideration by the people residing in those counties.

The points of the proposed plan which, in my opinion, justify it are as follows:

1. Less expensive than organizing trade classes in each high school.
2. Makes it possible to secure better teachers because of pooled finances
3. Its need is justified according to the industrial survey made.
4. Consolidation for efficiency is the modern trend in education. Money can be saved by consolidation before initial expenses have been incurred.

Yours very truly,

George S. Sanders,
State Supervisor of Trade and Industrial Education,
Phoenix, Arizona.

Appendix B

NEWSPAPER CLIPPINGS

Mission Times. Mission, Texas, March 16, 1939.

MRS. EARL WALLACE TO COMPLETE VOCATIONAL SCHOOL SURVEY HERE

Mission's report on the vocational survey which has been conducted in the Valley will be complete within a week, it was announced Thursday. Mrs. Earl Wallace has been appointed by the Mission Chamber of Commerce to contact employers in Mission to secure the necessary information for the report.

When completed, the Mission report will be added to those of other Valley cities and the whole compiled into a report which will be used to determine the Valley's need for a vocational high school. If the reports justify the school, leaders in the movement expect to ask legislation for a centrally located, state-supported high school to serve youth of the three Valley counties, training them for industrial and commercial vocations.

H. S. (Hamp) Edwards of La Joya has been appointed by the state education department to assist in checking final reports in order to see that every Valley town is accounted for in the survey.

Monitor. McAllen, Texas, September 29, 1938.

NEW VALLEY SCHOOL NEED IS SURVEYED

Edwards Says Check To Determine Fate Of Major Project

Mission--Preliminary surveys to determine the need for a vocational high school in the Valley are being made through school superintendents, Mission Lions Club members were told yesterday when H. S. (Hamp) Edwards, La Joya, was guest speaker.

Edwards, presented by program Chairman Roy Earnest, explained the plan for the proposed school, which would be centrally located and serve to train youths from three Valley counties in skilled trades and crafts. A bus service would be provided and the school would be state-supported and supervised. State vocational education leaders have shown favorable interest in the plan, Edwards said, and have promised every aid provided Valley leaders express a desire for the school and can show that there is a need for such a training center. Surveys under way at present will determine those factors, he claimed.

Fred Peabody, who recently moved to Mission from Dallas, was also a guest speaker and spoke briefly on his experiences while a resident of South America.

Monitor. McAllen, Texas, September 12, 1938.

FINAL REPORTS ON VOCATIONAL SCHOOL WAITED

Mission--Reports from four Valley cities are lacking to complete the vocational survey which has been conducted in this area as a preliminary step toward securing a centrally-located vocational school for the Valley.

In a letter received this week from James E. Hill, field man for the state education department's vocational division, H. S. (Hamp) Edwards was notified that reports were lacking from Mission, Edinburg, Pharr, and San Juan.

Edwards has been appointed on the committee to assist leaders in those cities to complete their reports so the statistics from the entire Valley may be compiled and the results of the survey be used in the next step toward securing the proposed educational center.

With a complete report, it is expected that the survey will prove the need for the school and legislation can be asked to make the project a certainty. Leaders in the educational field who are supporting the project believe that the reports received to date indicate that the need for the school is warranted. Drafting of a bill asking the legislature to provide for the school will be the next step after the survey is completed, it was announced.

Monitor. McAllen, Texas, September 12, 1938.

VALLEY SCHOOL MEET CALLED

Industrial Trade Plant Survey May Be Decided Upon At Session Tonight

Harlingen--A meeting of those interested in a survey of the Valley for a South Texas Trades and Industrial School will be held here tonight at 8 o'clock at the high school auditorium.

Dr. James R. D. Eddy, state director of vocational education, and Dr. Albert Kruger, state supervisor of vocational education, will be the principal speakers. The turn-out at this meeting will determine whether the state will spend funds already allocated for this survey, local leaders of the movement said.

The number of students unable to attend college from this section and the types of courses in trade and industries most applicable here will be the issues of the survey.

For some time work for the survey and the trades and industrial school has been pushed by Hamp Edwards, La Joya, Dr. James Knight, Harlingen, Mrs. H. E. Butt, Harlingen, E. C. Deering, Harlingen, and others. If the survey reveals a need for the school it is thought that it would be located almost on the Cameron-Hidalgo Counties line.

In the latter part of September Dr. L A. Woods, state superintendent of public instruction, is scheduled to make a tour of the Valley speaking in favor of the school.

Monitor. McAllen, Texas, September 5, 1938.

SCHOOL LEADERS TO BACK PLANS FOR NEW PLANT

Mission--In an effort to further the drive for establishing a central vocational training school for Cameron, Hidalgo and Willacy Counties, four prominent vocational education leaders will visit the Valley within a few weeks, Hamp Edwards of Mission reported today.

Dr. C. E. Germane, University of Missouri vocational guidance specialist, will speak at a meeting of principals, superintendents and teachers in Mercedes Friday evening at the high school building at 8 p.m. Anyone interested in the movement is invited to attend.

At Harlingen Monday, Sept. 12, a Valley-wide meeting will be held with James R. D. Eddy, state vocational director, and Albert Kruger, state vocational supervisor for South Texas, present. Plans will then be laid for a Valley-wide survey to study vocational needs and to promote interest in the project.

State Superintendent L. A. Woods will visit the Valley Sept. 30 in the interest of the undertaking.

According to the plans, payment of teachers' salaries is assured but so far no arrangements have been made for securing buildings and equipment for the school.

Mission Times. Mission, Texas, August 26, 1938.

VOCATIONAL SCHOOL PLANS TOLD ROTARY CLUB HERE MONDAY

Preliminary plans for establishment of a vocational training school in the Valley were outlined by H. S. (Hamp) Edwards of La Joya Monday noon at the weekly luncheon session of the Mission Rotary Club. After concluding his talk, Mr. Edwards asked Rotarians for an expression of their opinions concerning the plan, and urged that members of the club write James R. D. Eddy, Austin, state director of vocational education, endorsing the program.

After outlining briefly the progress of vocational education in America, Mr. Edwards revealed the proposed set-up for the Valley school. The school will be a regional institution supported by state funds, and will not conflict with academic work presented in the high schools.

He pointed out that students entering the proposed vocational school will be required to complete two years regular high school training or be 16 years of age, before admission to the school is granted. The school will be maintained primarily for students unable to attend college.

In a vote taken during a business session preceding Mr. Edwards' talk, the club favored the promotion of international understanding by presentation of five institutes of understanding in Rotary district No. 129 at which foreign speakers will appear; by organization of a regional conference made up of representatives from both Mexico and America; and by providing additional geographical studies for high schools and Rotary clubs in the district.

Also presented on the program were Misses Martha and Virginia McCurdy who gave musical selections. The program was in charge of E. W. Halstead.

Appendix C

SURVEY FORMS

Rio Grande Valley Occupational Survey

City or Ind. School Dist. _____ Name of Firm Oil Well Ser

Nature of Business Servicing Oil Wells

List the trades or occupations of employees.

Trades or Occupations	Number of Workers					
	Journeyman or Skilled		Apprentices or semi-skilled		Helpers or Unskilled	
	Male	Female	Male	Female	Male	Female
Superviser	2					
Operators	6					
Helpers			17			

Form No. 2

Occupational Survey of the Rio Grande Valley

City or Ind. School Dist. _____ Name of Firm _____

Trade or Occupation _____
(as listed on Form No. 1)

	Skilled Workers		Semi-skilled Workers		Unskilled Workers	
	Male	Female	Male	Female	Male	Female
1. Number engaged a. Anglo-American	8		17			
b. Latin Amer.						
c. Afro-Amer.						
2. Average Age	25		22			
3. Average daily wage	6.00		5.00			
4. Approximate days worked per year	330		330			
5. Number of new workers needed each year	2		30			
6. Number of new, trained workers which can be supplied locally	by advancement					
7. Educational qualifications desired. (N for none; El, elementary school; H, High School; C, College; S, Special Courses; V, Vocational School)	H.					
8. Is pre-employment training desired? Answers can be listed in detail on Form #3, where space is provided. (See question 9, Form 3.)	yes (Indicate yes or no in this space.)		yes			
9. How are present workers trained? (A, Apprenticeship; O, on the job; S, special courses; V, vocational school; E, previous experience.)	O		O			
10. Are present workers sufficiently trained? Answers can be listed in detail on Form #3, where space is provided. (See question 2, Form 3.)	yes (Indicate yes or no in this space.)					

Form No. 4

Rio Grande Valley Occupational Survey

City or Ind. School Dist. _____ Name of Firm _____

Occupation _____

1. Are present workers satisfactory? _____ If not, give reasons.

2. What are your suggestions as to what can be done to improve the efficiency of the workers? _____

3. Are the present beginners in the occupation satisfactory? _____
If not, give reasons _____

4. Do you have difficulty in securing additional workers? _____

5. Do unskilled workers in this occupation become semi-skilled workers?
Yes If so, how long does it take? _____
Is any additional training necessary for them to do so? _____
Where and how should it be given? _____

6. Do semi-skilled workers in this occupation become skilled workers? Yes
If so, how long does it take? Year or more
Is additional training necessary for them to do so? _____
Where and how should it be given? _____

7. What employment possibilities are there in this occupation for young workers? Good

8. What promotional possibilities are presented to these workers? (Question 7)
About One in Five Can
go up to Top

9. What kind of special courses or special training, if any, should new workers in this occupation have before being employed? _____
Any kind of mech. Ir. such
as Automatic Engineering

x = one

y = other

$x + y = 7$

$x - y = 9$

$2x = 16$

$x = 8$

$8 + y = 7$

$y = -1$

7

$x + y = 7$

$\frac{x}{y} = 7$

$x + y = 7$

$x - y = 16$

$2x = 23$

$y = 16$

x

$x = 7y$

$3z = 2x$

$3z = 5x + 5y$

$y + x = 16$

$x + 7 = 16$

7

Appendix D

COURSE OF STUDY

INSTRUCTIONS FOR USING THE INDIVIDUAL PROGRESS CHART

Grades are recorded in clockwise order, and when a student has mastered an operation, the fact is shown by a check mark placed alongside the rectangle containing grades for the particular operation. If a student shows sufficient skill after repeating an operation one, two, three, or four times, the instructor may grade accordingly, giving a final check only when a satisfactory stage is reached in doing a particular operation. The diagonals should be drawn by the instructor or student as needed.

Unit F. Universal Saw

Type Job 1. Crosscutting

Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels

Operation 1. Squaring one end 1

2. Crosscutting to mark 2

3. Dimension crosscutting (CO block) 3

4. Dimension crosscutting (CO gauge) 4

5. Notching (crosscut and ripsaw) 5

6. Dimension sawing (gauges and yokes) 6

Block 1 - M C
Unit B
Type Job 2

COURSE OUTLINE FOR MILL CABINETMAKING

Block 1. Machine Operation

Unit A. The Cut-off Saw
Type Job 1. Rough Sawing
Specific Job a. Initial cutting of stocks for all jobs.

Operation		
1.	Selecting and grading stock	1
2.	Laying out lengths economically	2
3.	Cutting off stock singly to a mark	3
4.	Cutting off stock one length (gauge)	4
5.	Cutting off stock in multiple lengths (gauge)	5
6.	Cutting off stock on bevel	6

Unit B. The Jointer
Type Job 1. Edge Jointing
Specific Job a. Stiles, rails, bars, casings and aprons
b. Legs and posts
c. Solid panels, tops etc.

Operation		
1.	Facing	1
2.	Jointing first edge	2
3.	Bevel edge jointing	3
4.	Chamfering	4
5.	End jointing	5
6.	Glue jointing	6

Type Job 2. Surface Jointing
Specific Job a. Stiles, rails, bars, casings and aprons
b. Legs, posts, etc.

Operation		
1.	Surface planing to remove wind or warp	1
2.	Planing strips (fingerboard)	2

Block I
Unit D
Type Job 1

3. Rabbeting	3	
4. Taper planing	4	
5. Diagonal planing	5	

Unit C. Surfacer or Thickness Planer
Type Job 1. Dimensioning to Thickness
Specific Job a. Stiles, rails
b. Strips
c. Legs, posts
d. Panels, tops

Operation 1. Dimension planing (thickness)	1	
2. Diagonal planing	2	
3. Planing thin stock on a rider	3	

Type Job 2. Dimensioning to Width
a. Stiles, rails, casings
b. Legs, posts
c. Strips

Operation 1. Dimension or bunch planing (width)	1	

Unit D. Ripsaw
Type Job 1. Ripping Flat Stock
Specific Job a. Stiles, rails, casings
b. Legs, posts, etc.
c. Tops and panels

Operation 1. Planing ripping	1	
2. Dimension ripping (Planner saw)	2	
3. Resawing	3	
4. Bevel ripping on table	4	
5. Bevel ripping on fence	5	
6. Notching crosscut and ripping (ripsaw)	6	
7. Dimension sawing loose panel stock	7	
8. Dimension sawing glued up panels	8	

Block I
Unit E
Type Job 2

9. Dimension sawing square panels	9	
10. Sawing to line (sweeps and bevels)	10	
11. Strip ripping (fingerboard)	11	

Type Job 2. Ripping Bevelwise
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops and panels

Operation 1. Bevel ripping on table	1	
2. Bevel ripping on fence	2	
3. Compound beveling	3	

Unit E. Variety Saw
Type Job 1. Crosscutting
Specific Job a. Stiles, rails, casings, etc. (small parts)
b. Legs, posts, etc.
c. Brackets, frames
d. Drawers, cases

Operation 1. Dimension sawing	1	
2. Bevel crosscutting (mitering)	2	
3. Squaring one end	3	
4. Crosscutting to mark	4	
5. Dimension crosscutting (CO block)	5	
6. Dimension crosscutting (CO gauge)	6	
7. Notching (crosscut and rip saw)	7	
8. Dimension sawing (gauges and yokes)	8	

Type Job 2. Ripsawing
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels

Operation 1. Plain ripping	1	
2. Dimension ripping (planner saw)	2	

Block I
Unit F
Type Job 1

3. Resawing	3	
4. Bevel ripping on table	4	
5. Bevel ripping on fence	5	
6. Notching (crosscut and ripsaw)	6	
7. Dimension sawing loose panel stock	7	
8. Dimension sawing glued up panels	8	
9. Dimension sawing square panels	9	
10. Strip ripping fingerboard	10	
11. Cutting off stock	11	

Type Job 3. Bevel Sawing
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels
d. Segments

Operation 1. Bevel ripping on table	1	
2. Compound beveling	2	
3. Surface dovetailing for cleats	3	
4. Wedge sawing	4	
5. Taper sawing with taper jig	5	
6. Segment sawing	6	

Unit F. Universal Saw
Type Job 1. Crosscutting
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels

Operation 1. Squaring one end	1	
2. Crosscutting to mark	2	
3. Dimension crosscutting (CO block)	3	

Block I
Unit F
Type Job 3

4. Dimension crosscutting (CO gauge) 4
5. Notching (crosscut and ripsaw) 5
6. Dimension sawing (gauges and yokes) 6

Type Job 2. Ripsawing
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels
Operation 1. Plain ripping 1
2. Dimension rippint (planer saw) 2
3. Resawing 3
4. Bevel ripping on table 4
5. Bevel ripping on fence 5
6. Notching crosscut and ripsaw 6
7. Dimension sawing loose panel stock 7
8. Dimension sawing glued up panels 8
9. Dimension sawing square panels 9
10. Sawing grooves and bevels to a line 10
11. Strip ripping (fingerboard) 11

Type Job 3. Bevel Sawing
Specific Job a. Stiles, rails, casings
b. Legs, posts
c. Tops, solid panels
d. Segments
Operation 1. Bevel ripping on table 1
2. Compound beveling 2
3. Surface dovetailing for cleats 3
4. Wedge sawing 4
5. Taper sawing with taper jig 5
6. Segment sawing 6

Block I
Unit F
Type Job 7

Type 4. Rabbeting
Specific Job a. Casings and frames
b. Panels and doors
c. Cases
d. Molding and trim

Operation		
1. Rabbeting (two cuts)	1	
2. Fillister cutting (two cuts)	2	
3. Rabbeting (dado head)	3	
4. Fillister cutting (dado head)	4	
5. End or edge dovetailing	5	

Type 5. Groving and Plowing
Specific Job a. Door and panel parts
b. Molding and trim
c. Casing and frame parts
d. Case parts

Operation		
1. Grooving (ripsaw)	1	
2. Grooving (dado head)	2	
3. Circular routing (core box)	3	
4. Grooving on bevel	4	

Type Job 6. Dadoing or Routing
Specific Job a. Frames and casings
b. Cases and shelves
c. Stairwork

Operation		
1. Dadoing (crosscut saw)	1	
2. Dadoing (dado head)	2	
3. Notching (dado head)	3	
4. Dadoing on bevel	4	

Type Job 7. Tenon Sawing
Specific Job a. Door and panel parts
b. Frames, casings, fronts
c. Shelves and partitions
d. Aprons and rails

Block I
Unit G
Type Job 1

Operation 1. Tenoning with dado head 1
2. Slip tenon cutting 2
3. Shouldered tenon cutting 3

Type Job 8. Veining and Lining
Specific Job a. Panels and tops
b. Legs and posts
c. Rails, stiles, bars, and aprons
Operation 1. Veining and lining corners 1
2. Veining and lining flat surfaces 2
3. Veining and lining edges 3
4. Veining and lining curved surfaces 4

Type 9. Shaping
Specific Job a. Tops and shelves
b. Molding and trim
c. Panel frame parts
d. Posts, legs
Operation 1. Shaping circular edges 1
2. Shaping straight edges 2
3. Shaping strips and moldings 3
4. Fluting 4

Type 10. Novelty Cutting
Specific Job a. Posts, legs
b. Overlay
c. Inlays
Operation 1. Sawing banding and inlay lines 1
2. Sawing spirals 2

Unit G. Dimension or Trimmer Saw (Table Type)
Type Job 1. Dimension or Cutting to Net Length
Specific Job a. Stiles, rails, etc.
b. Legs, posts
c. Tops, panels, shelves

Block I
Unit H
Type Job 2

Operation 1. Squaring one end	1	
2. Crosscutting t mark	2	
3. Dimension crosscutting (CO gauge)	3	
4. Bevel crosscutting (mitering)	4	
5. Dimension sawing glued up panels	5	
6. Dimension sawing square panels	6	

Unit H. Mortiser
Type Job 1. Longitudinal mortising
Specific Job a. Door and panel parts
b. Frames, casing fronts
c. Legs, posts

Operation 1. Blind mortising longitudinally	1	
2. Through mortising	2	
3. Slip mortising	3	
4. Notching	4	
5. Sinking surfaces	5	
6. Locating duplicate mortises	6	
7. Changing chisels and bits	7	
8. Bevel mortising and boring	8	

Type Job 2. Transverse Mortising
Specific Job a. Frames, casings, fronts
b. Legs, posts

Operation 1. Blind mortising transversally	1	
2. Trough mortising	2	
3. Notching	3	
4. Gaining - dadoing - housing	4	
5. Locating duplicate mortises	5	
6. Changing chisels and bits	6	

Block I
Unit I
Type Job 1

Type Job 3. Routing
Specific Job a. Stiles, rails, etc.
b. Legs, posts
c. Tops, panels, shelves
d. Inlay and decoration

Operation		
1. Routing	1	
2. Gaining - dadoing - housing	2	
3. Sinking surfaces	3	
4. Changing chisels and bits	4	

Type Job 4. Boring
Specific Job a. Stiles, rails, aprons
b. Legs, posts
c. Tops, panels

Operation		
1. Changing chisels and bits	1	
2. Through boring	2	
3. Depth boring	3	
4. Countersinking and boring	4	
5. Locating duplicate holes	5	

Unit I. Boring Machine
Type Job 1. Edge Boring
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Block, cleats

Operation		
1. Changing chisels and bits	1	
2. Through boring	2	
3. Depth boring	3	
4. Countersinking and boring	4	
5. Locating duplicate holes	5	
6. Angle boring	6	

Block I
Unit J
Type Job 1

Type Job 2. Flat Boring
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats

Operation		
1. Changing chisels and bits	1	
2. Through boring	2	
3. Depth boring	3	
4. Countersinking and boring	4	
5. Locating duplicate holes	5	
6. Angle boring	6	

Type Job 3. End Boring
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats

Operation		
1. Changing chisels and bits	1	
2. Depth boring	2	
3. Countersinking and boring	3	
4. Locating duplicate holes	4	

Type Job 4. Routing
Specific Job a. Stiles, rails, aprons
b. Legs, posts
c. Tops, panels

Operation		
1. Changing chisels and bits	1	
2. Through routing mortises	2	
3. Depth routing mortises	3	

Unit J. Tenoner
Type Job 1. Flat tenoning
Specific Job. a. Door and panel parts
b. Frames, casings, fronts
c. Posts and brackets, braces

Block I
Unit K
Type Job 1

Operation 1. Slip tenoning cheek cutting 1
2. Cutting tongues 2
3. Cutting rabbets and fillisters 3
4. Dimension sawing to length 4
5. Offset shouldering 5
6. Flat beveled tenons 6

Type Job 2. Edge Tenoning
Specific Job a. Door and panel parts
b. Frames, casings, fronts
c. Posts and brackets, braces
Operation 1. Edge shouldering 1
2. Haunched tenoning 2
3. Notching 3
4. Edge beveled tenons 4

Type Job 3. Coped tenoning
Specific Job a. Rails, stiles, bars
Operation 1. Cutting coped tenons 1

Unit K. Disc Sander
Type Job 1. End Grain Sanding
Specific Job. a. Tops and panels
b. Legs and posts
Operation 1. Straight end grain sanding 1
2. Beveled end grain sanding 2
3. Curved end grain sanding 3
4. Flat bevel sanding 4
5. Edge bevel sanding 5
6. Spindle end sanding 6

Block I
Unit L
Type Job 2

Type Job 2. Edge grain sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats
Operation 1. Straight edge sanding 1
2. Curved edge sanding 2
3. Flat bevel sanding 3
4. Edge bevel sanding 4

Type Job 3. Fitting
Specific Job a. Doors and panels
b. Drawers
Operation 1. Drawer fitting 1
2. Door and panel fitting 2

Unit L. Belt Sander
Type Job 1. Flat Sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats
e. Molding
Operation 1. Narrow surface sanding 1
2. Wide surface sanding 2
3. Sanding right angle grains (assembled) 3
4. Assembled case sanding 4

Type Job 2. Edge Sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats
e. Molding
Operation 1. Straight edge sanding 1
2. Curved edge sanding 2

Block I
Unit N
Type Job 1

Type Job 3. Caul and Form Block Sanding
Specific Job a. Moldings
b. Curved parts
Operation 1. Curved sanding 1
2. Concaved sanding 2
3. Shaped sanding 3

Unit M. Drum Sander (Single)
Type Job 1. Flat Sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats
e. Molding
Operation 1. Narrow surface sanding 1
2. Wide surface sanding 2
3. Assembled case sanding 3

Type Job 2. Edge Sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats
e. Molding
Operation 1. Straight edge sanding 1
2. Curved edge sanding 2
3. Flat bevel sanding 3
4. Edge bevel sanding 4
5. Convex sanding 5
6. Concave sanding 6

Unit N. Turning Lathe
Type Job 1. Preparing stock
Specific Job a. Spindles, balusters, finials, rounds, legs
b. Bases, caps, bowls
c. Rosettes, buttons, split turnings

Block I
Unit N
Type Job 3

Operation 1. Centering spindle stock	1	
2. Centering face plate stock	2	

Type Job 2. Spindle Turning
Specific Job a. Spindles, balusters, finials, rounds, legs
b. Bases, caps, bowls
c. Rosettes, buttons, split turnings

Operation 1. Parallel spindle turning	1	
2. Taper turning	2	
3. Shoulder spindle turning	3	
4. Concave spindle turning	4	
5. Convex spindle turning	5	
6. Scrape turning	6	
7. Skew cut turning	7	
8. Color combination turning	8	
9. Split turning	9	
10. Ring turning (loose)	10	

Type Job 3. Plain Face Plate Turning
Specific Job a. Bases, caps, finials
b. Bowls
c. Rosettes

Operation 1. Dowel fitting	1	
2. Edge face plate turning	2	
3. Straight surface plate turning	3	
4. Concave face plate turning	4	
5. Convex face plate turning	5	
6. Dish turning	6	
7. Color combination turning	7	

Block I
Unit N
Type Job 6

8. Butt-end face plate turning	8	
9. Glue chuck turning	9	
10. Ring turning (loose)	10	

Type Job 4. Special Face Plate Turning
Specific Job a. Bases, caps, finials
b. Bowls
c. Rosettes
d. Rings

Operation 1. Ring turning (friction chuck)	1	
2. Knob turning	2	
3. Dish turning	3	
4. Veining	4	
5. Inlaying	5	
6. Glue chuck turning	6	

Type Job 5. Spiral Turning
Specific Job a. Spindles, rounds, balusters, legs

Operation 1. Spiral turning layout	1	
2. Sawing and roughing	2	
3. Carving	3	
4. Smoothing	4	

Type Job 6. Boring
Specific Job a. Spindles
b. Bases, caps
c. Cleats and blocks

Operation 1. Plug cutting	1	
2. Straight spindle boring (chuck)	2	
3. Plain boring (chuck)	3	
4. Dowel fitting	4	

Block I
Unit 9
Type Job 1

Type Job 7. Novelty Turning
Specific Job a. Spindles, etc.
b. Bowls, goblets
Operation 1. Glue chuck turning 1
2. Ring turning (loose) 2
3. Ring turning (friction chuck) 3
4. Thurming 4

Type Job 8. Sanding and Polishing
Specific Job a. All turned parts
Operation 1. Spindle sanding 1
2. Face plate sanding 2
3. Filling 3
4. Oil polishing 4
5. French polishing 5

Type Job 9. Tool sharpening and care
Specific Job a. Chisels
b. Gouges
Operation 1. Shaping 1
2. Grinding 2
3. Whetting 3

Unit 0. Shaper
Type Job 1. Sticking edge moldings
Specific Job a. Tops, shelves
b. Stiles, rails, bars, stretchers, frames
c. Blocks, brackets
Operation 1. Setting up solid cutters 1
2. Setting up knife cutters 2
3. Molding straight edges (sticking) 3
4. Molding concaved edges (sticking) 4

Block I
Unit 0
Type Job 3

5. Molding convex edges (sticking)	5	
6. Molding inside frame edges	6	
7. Shaping with templates	7	
8. Panel raising	8	

Type Job 2. Sticking Sprung and Flat Mouldings
Specific Job a. Stiles, rails, bars, stretchers frames
b. Molding and trim

Operation 1. Straight sticking	1	
2. Convex sticking	2	
3. Concave sticking	3	
4. Setting up solid cutters	4	
5. Setting up knife cutters	5	
6. Fluting	6	
7. Reeding	7	
8. Shaping with templates	8	

Type Job 3. Sticking Joints
Specific Job a. Tops, shelves
b. Stiles, rails, bars, stretchers, frames
c. Block, brackets

Operation 1. Setting up solid cutters	1	
2. Setting up knife cutters	2	
3. Grooving	3	
4. Rabbeting and fillistering	4	
5. Tonguing	5	
6. Glue jointing	6	
7. Dovetailing	7	

Block I
Unit P
Type Job 3

Type Job 4. Tenoning
Specific Job a. Stiles and rails
b. Bars and aprons
Operation 1. Tenoning with saws 1
2. Tenoning with cutters 2
3. Coping 3

Type Job 5. Shaping with Dividing Head
Specific Job a. Turned spindles, legs, posts
Operation 1. Setting up solid cutters 1
2. Setting up knife cutters 2
3. Fluting 3
4. Reeding 4
5. Shaping with templates 5

Unit P. Router (Stationary and Portable)
Type Job 1. Sinking Surfaces
Specific Job a. Fronts
b. Aprons rims
Operation 1. Pin and template routing 1
2. Cut out template routing 2
3. Freehand routing to line 3

Type Job 2. Mortising
Specific Job a. Joined parts
Operation 1. Mortising to line 1
2. Mortising with template 2
3. Pin and template mortising 3
4. Mortising with jig 4

Type Job 3. Fretwork
Specific Job a. Grilled fronts
b. Brackets
Operation 1. Freehand 1

Block I
Unit Q
Type Job 1

2. Pin and template 2
3. With template 3

Type Job 4. Sticking Moldings
Specific Job a. Small tops
b. Small ends
c. Shelves
Operation 1. Freehand 1
2. With template 2

Type Job 5. Inlaying, Veining, and Lining
Specific Job a. Tops, panels
b. Aprons and fronts
Operation 1. Freehand 1
2. With template 2
3. Pin and template 3

Type Job 6. Dovetailing
Specific Job a. Corners
b. Tops and panels
Operation 1. With dovetail template 1
2. Dadoing 2
3. Grooving 3

Unit Q. Spindle Carver
Type Job 1. Flat Carving
Specific Job a. Panels and tops
b. Aprons and rims
c. Inlays
Operation 1. Line carving 1
2. Sunken and chip carvings 2
3. Relief carving 3

Block I
Unit R
Type Job 3

Type Job 2. Turned Carving
Specific Job a. Ball and Queen Anne feet
b. Spindle, posts, and legs
c. Caps, finishes, and bowls
Operation 1. Line carvings 1
2. Sunken and chip carvings 2
3. Relief carvings 3

Unit R. Bandsaw
Type Job 1. Contour Sawing
Specific Job a. Aprons, rims
b. Tops, shelves
c. Segments, arches
d. Ornaments, brackets, and legs
Operation 1. Cut planing 1
2. Circular sawing outside curves 2
3. Circular sawing inside curves 3
4. Sawing reverse curves 4
5. Multiple sawing 5

Type Job 2. Dimension Sawing
Specific Job a. Stiles, aprons, and rails
b. Tops, shelves
c. Legs, posts
Operation 1. Ripping to a line 1
2. Crosscutting to a line 2
3. Resawing using square 3
4. Resawing using jig 4
5. Cut planing (multiple) 5

Type Job 3. Bevel Sawing
Specific Job a. Aprons and rims
b. Segments and arches
c. Ornaments and brackets

Block I
Unit S
Type Job 2

Operation 1. Cut planing — 1
2. Diagonal splitting of stock — 2
3. Bevel sawing (table tilted) — 3

Type Job 4. Jig and Template Sawing
Specific Job a. Split turnings
b. Small parts and decorations
c. Tops, etc.
d. Rails, aprons, etc.
Operation 1. Cut planing — 1
2. Resawing using jig — 2
3. Splitting spindles and round stock (cutting box) — 3
4. Shaped sawing to pattern-jig — 4
5. Sawing circles (radius jig) — 5

Unit S. Molder and Sticker
Type Job 1. Moldings
Specific Job a. Bed molds
b. Spring molds
c. Bases and shaped casings
Operation 1. Setting up — 1
2. Feedings — 2
3. Offbearing — 3

Type Job 2. Dimension Shapes
Specific Job a. Dimension stock
b. Flooring and matched shapes
Operation 1. Setting up — 1
2. Feeding — 2
3. Offbearing — 3

Block I
Unit T
Type Job 4

Unit T. Drill Press

Type Job 1. Mortising

Specific Job a. Joined parts

Operation 1. Mortising to a line 1

2. Mortising with template 2

3. Pin and template mortising 3

4. Mortising with a jig 4

Type Job 2. Boring

Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Tops, panels
d. Blocks, cleats

Operation 1. Changing chisels and bits 1

2. Through boring 2

3. Depth boring 3

4. Countersinking and boring 4

5. Locating duplicate holes 5

Type Job 3. Shaping

Specific Job a. Tops and shelves
b. Moulding and trim
c. Panel frame parts
d. Posts, legs

Operation 1. Shaping circular edges 1

2. Shaping straight edges 2

3. Shaping strips and mouldings 3

4. Fluting 4

5. Reeding 5

Type Job 4. Routing

Specific Job a. Stiles, rails, aprons
b. Legs, posts
c. Tops, panels

Block I
Unit T
Type Job 8

Operation 1. Changing chisels and bits 1
2. Through routing mortises 2
3. Depth routing mortises 3

Type Job 5. Carving
Specific Job a. Panels and tops
b. Aprons and rims
c. Inlays
Operation 1. Line carvings 1
2. Sunken and chip carvings 2
3. Relief carving 3

Type 6. Dovetailing
Specific Job a. Corners
b. Tops and panels
Operation 1. Open 1
2. Blind 2
3. With dovetail template 3
4. Dadoing 4
5. Grooving 5

Type Job 8. Spindle sanding
Specific Job a. Stiles, rails, brackets
b. Legs, posts
c. Blocks, cleats
d. Moulding
e. Fretwork and grill work
Operation 1. Curved edge sanding 1
2. End sanding 2
3. Edge sanding 3
4. Fretwork sanding 4

Block I
Unit U
Type Job 3

Unit U. Jig Saw or Scroll Saw

Type Job 1. Straight lines Sawing

Specific Job a. Blocks
b. Fretwork and grill work
c. Small parts and decorations
d. Tops, doors

Operation		
1. Selecting and changing saw blades	1	
2. Dimensioning to length	2	
3. Dimensioning to width	3	
4. Fretting	4	

Type Job 2. Circular Sawing

Specific Job a. Blocks
b. Small parts and decorations
c. Tops, doors and grill work

Operation		
1. Selecting and changing saw blades	1	
2. Resawing using jig	2	
3. Shaped sawing to pattern-jig	3	
4. Circular fretting	4	

Type Job 3. Irregular Sawing

Specific Job a. Blocks
b. Small parts and decorations
c. Tops, doors
d. Legs, posts

Operation		
1. Changing saw blades	1	
2. Resawing using jig	2	
3. Shaped sawing to pattern-jig	3	
4. Combination fretting	4	
5. Multiple sawing	5	

Block II
Unit B
Type Job 2

Block II. Maintenance Work (Millwright Work)

Unit A . Lubrication
Type Job 1. Greasing
Specific Job a. Motors
b. Machines
c. Parts and fixtures
Operation 1. Filling grease cups
(a) Open type cups
(b) Compression cups
2. General inspection
3. Using Alemite fittings
4. Using Zerk fittings

Type Job 2. Oiling
Specific Job a. Motors
b. Machines
c. Parts and fixtures
Operation 1. Filling oil cups
2. General inspection
3. Filling reservoir or self-oiler

Unit B. Setting up and Adjusting
Type Job 1. Circular Saws
Specific Job a. Cut off
b. Rip
c. Miter
Operation 1. How to set up and adjust circular saws
2. How to set up and change dado cutters
3. How to set up and change molding heads

Type Job 2. Scroll Jig Saws
Specific Job a. Bench
b. Pedestal
Operation 1. Setting and adjusting blades
2. Adjusting guides

Block II
Unit B
Type Job 6

Type Job 3. Bandsaws
Specific Job a. Bench
b. Standard
Operation 1. Setting and adjusting blades 1
2. Adjusting guides and rollers 2
3. Cleaning guides and rollers 3
4. Setting up special jigs and fixtures 4
5. Replacing rubber bands 5
6. Coiling blades 6
7. Cleaning rubber bands 7

Type Job 4. Hollow Chisel Mortiser; Borer
Specific Job a. Horizontal
b. Vertical
Operation 1. Setting up and adjusting bits and chisels 1
2. Adjusting table, fittings, and jigs 2
3. Filing bits and chisels 3
4. Grinding drills 4

Type Job 5. Tenoner
Specific Job a. Single end
Operation 1. Setting tenon knives 1
2. Setting cope cutters 2
3. Aligning carriage 3
4. Setting carriage fittings 4
5. Aligning gibbed ways 5

Type Job 6. Planers
Specific Job a. Hand planers and jointers
b. Surfacer

Block II
Unit B
Type Job 9

Operation 1. Setting knives 1
2. Aligning rollers 2
3. Adjusting chip breaker 3
4. Aligning table 4
5. Aligning shoe or platen 5

Type Job 7. Sanders
Specific Job a. Belt
b. Disc
c. Drum
d. Spindle
Operation 1. Adjusting tables 1
2. Adjusting disc 2
3. Adjusting drum 3
4. Affixing paper 4
5. Splicing abrasive belts 5
6. Setting jigs 6

Type Job 8. Routers
Specific Job a. Portable
b. Stationary
Operation 1. Adjusting head and chuck 1
2. Setting cutters 2
3. Setting jigs 3

Type Job 9. Spindle Carvers
Specific Job a. Stationary
Operation 1. Adjusting head and chuck 1
2. Setting cutters 2
3. Setting jigs 3

Block II
Unit E
Type Job 1

Unit C. Grinding
Type Job 1. Machine Knives and Cutters
Specific Job a. Planers
b. Tenoners
c. Shapers
d. Molder
e. Router and carver

Operation		
1. Straight grinding in machine	1	
2. Straight grinding loose flat knives	2	
3. Laying out flat shaped knives	3	
4. Grinding shaped flat knives	4	
5. Grinding solid cutters	5	
6. Drawing and tempering	6	

Unit D. Grinding Saws
Type Job 1. Circular
Specific Job a. Rip (coarse tooth principally)
b. Crosscut
c. Combinations

Operation		
1. Jointing	1	
2. Gumming	2	
3. Sharpening	3	

Unit E. Saw Fitting by Hand
Type Job 1. Bandsaws
Specific Job a. Narrow
b. Wide

Operation		
1. Jointing	1	
2. Gumming	2	
3. Filing	3	
4. Setting	4	
5. Dressing	5	
6. Brazing	6	

Type Job 2. Circular Saw
Specific Job a. Rip
b. Crosscut
c. Combination
Operation 1. Jointing 1
2. Gumming 2
3. Filing 3
4. Setting 4
5. Swaging 5
6. Dressing 6
7. Hammering 7

Unit F. Power Transmission
Type Job 1. Belt Drives
Specific Job a. Line shafts
b. Countershafts
c. Direct drives
Operation 1. Figuring speeds 1
2. Selecting belt 2
3. Fitting belt 3
4. Splicing 4
5. Tracking belts 5
6. Tightening belts 6

Type Job 2. Gear Drives
Specific Job a. Trains of gears
b. Gears and pinions
c. Ring gears
d. Worm gears
Operation 1. Figure speeds 1
2. Align and adjust 2
3. Fit keyway 3
4. Tighten loose gears 4
5. Replacing gears 5

Block II
Unit G
Type Job 1

Type Job 3. Friction Drives
Specific Job a. Variable speed disc
b. Cone reversing

Operation 1. Align and adjust	1	
2. Renew faces	2	
3. True faces	3	

Unit G. Power Supply
Type Job 1. Electric Motors
Specific Job a. Ratings

Operation 1. Check voltage	1	
2. Select size	2	
3. Check speed	3	

Specific Job b. Brushes

Operation 1. Replace	1	
2. Adjust	2	

Specific Job c. Commutators

Operation 1. Clean	1	
2. Resurface	2	

Specific Job d. Switches

Operation 1. Clean	1	
2. Adjust	2	
3. Replace parts	3	
4. Connect	4	

Specific Job e. Bearings

Operation 1. Check	1	
2. Replace balls and races	2	
3. Replace bronze bearings	3	

Block II
Unit H
Type Job 3

Unit H. Machine Setting

Type Job 1. Floor Plan Layout

Specific Job a. Plan production line

Specific Job b. Locate single machine

Operation 1. Measuring for location 1

2. Measuring elevations 2

3. Locating fastenings 3

Type Job 2. Foundations

Specific Job a. Concrete

Operation 1. Excavating and soil testing 1

2. Form building 2

3. Reinforcing 3

4. Setting bolts 4

5. Pouring and finishing 5

Specific Job b. Timber

Operation 1. Laying out 1

2. Setting 2

3. Fastening 3

Specific Job c. Metal

Operation 1. Setting sub-foundation 1

2. Laying out and drilling 2

3. Setting and bolting 3

Type Job 3. Leveling

Specific Job a. Foundations

Specific Job b. Machine bases

Operation 1. Getting elevations 1

2. Wedging 2

3. Grouting 3

4. Bolting 4

Block III
Unit A
Type Job 1

Type Job 4. Assembling
Specific Job a. Bases
b. Parts and fixtures
Operation 1. Inspecting 1
2. Adjusting 2
3. Painting inaccessible places 3
4. Fastening 4

Unit I. Cleaning
Type Job 1. Overhaul Cleaning
Specific Job a. Bases and frames
b. Parts and fixtures
c. Blower and lines
Operation 1. Disassembling 1
2. Soaking 2
3. Scraping and brushing 3
4. Chipping 4
5. Repainting 5

Type Job 2. Inspection Cleaning
Specific Job a. Bases and frames
b. Parts and fixtures
c. Blower and lines
Operation 1. Brushing and wiping 1
2. Scraping 2
3. Blowing off 3
4. Inspection 4

Block III. Bench Work (Cabinetmaking)

Unit A. Sawing
Type Job 1. Crosscutting
Specific Job a. Stock to dimension
Operation 1. Square crosscutting 1
2. Bevel crosscutting 2

Block III
Unit A
Type Job 4

Specific Job b. Joints
Operation 1. Square crosscutting 1
2. Beveled crosscutting 2
3. Shouldered crosscutting 3

Specific Job c. Fitting parts
Operation 1. Square crosscutting 1
2. Square ripping 2
3. Shoulder crosscutting 3
4. Kerf crosscutting 4

Type Job 2. Ripping
Specific Job a. Stock to dimension
b. Joints
c. Fitting parts
Operation 1. Resawing 1
2. Square ripping 2
3. Bevel ripping 3
4. Kerf ripping 4

Type Job 3. Beveling
Specific Job a. Joints
Operation 1. Flat mitering 1
2. Edge mitering 2
3. Compound mitering 3
4. Mitering in box 4

Type Job 4. Circumferential
Specific Job a. Tops and panels
b. Rims, aprons, and fronts
c. Holes

Block III
Unit B
Type Job 3

Operation 1. Keyhole sawing — 1
2. Compass sawing — 2
3. Coping curved shapes — 3
4. Coping of molding — 4
5. Turning sawing — 5

Unit B. Planing
Type Job 1. Edge
Specific Job a. Stock to dimension
b. Stock to shape
c. Joints to fit
Operation 1. Scrub planing — 1
2. Jointing — 2
3. Dimension planing — 3
4. Curved edge planing — 4
5. Straight end planing — 5
6. Curved end planing — 6

Type Job 2. Surface
Specific Job a. Stock to dimension
b. Stock for appearance (matching)
c. Joints
Operation 1. Scrub planing — 1
2. Truing — 2
3. Smoothing — 3
4. Dimension planing — 4
5. Tooth planing — 5

Type Job 3. Shaped
Specific Job a. Tops and panels
b. Aprons and rails
c. Moldings
d. Patterns

Block III
Unit D
Type Job 1

Operation 1. Sticking molding — 1
2. Matching — 2
3. Rabbet planing — 3
4. Router planing — 4
5. Core box planing — 5
6. Dead planing — 6
7. Chamfer planing — 7
8. Shoot--planing — 8

Unit C. Scraping
Type Job 1. Hand Steel Scraping
Specific Job a. Tops and panels
Operation 1. Cleaning up — 1
2. Surface hand scraping — 2
3. Surface push scraping — 3

Specific Job b. Joint intersections
Operation 1. Cleaning up — 1
2. Surface hand scraping — 2
3. Surface push scraping — 3

Specific Job c. Moldings
Operation 1. Shaped scraping — 1

Unit D. Smoothing and Preparing for Finish
Type Job 1. Sanding
Specific Job a. Parts
b. Unit assemblies
c. Assemblies
Operation 1. Block sanding — 1
2. Folded paper sanding — 2
3. Shaped sanding — 3
4. Tempering — 4

Block III
Unit E
Type Job 3

Type Job 2. Filing
Specific Job a. Curved parts and decorations
Operation 1. Flat filing 1
2. Curved filing 2

Unit E. Boring
Type Job 1. Brace and Bit
Specific Job a. Decorations and all parts
Operation 1. Through boring 1
2. Depth boring 2
3. Bevel boring 3

Specific Job b. Joints
Operation 1. Through boring 1
2. Depth boring 2
3. Bevel boring 3

Type Job 2. Hand Drill
Specific Job a. Fastenings
Operation 1. Through 1
2. Depth 2
3. Bevel 3

Type Job 3. Electrical Drill
Specific Job a. Decorations and all parts
b. Joints
c. Fastenings
Operation 1. Through boring 1
2. Depth boring 2
3. Bevel boring 3
4. Countersinking 4
5. Counterboring 5

Block III
Unit G
Type Job 2

Unit F. Chiseling
Type Job 1. Firmer
Specific Job a. Fitting all parts
b. Joints
c. Patterns
Operation 1. Roughing 1
2. Bottoming 2
3. Shouldering 3
4. Paring 4
5. Mortising 5

Type Job 2. Gouging
Specific Job a. Fitting all parts
b. Joints
c. Patterns
Operation 1. Inside gouging 1
2. Outside gouging 2

Unit G. Assembling
Type Job 1. Fitting
Specific Job a. Front, aprons, rails, stiles
b. Framed panels
c. Tops and solid panels
d. Drawers and cases
Operation 1. Fitting joints 1
2. Fitting doors 2
3. Fitting drawers 3
4. Fitting shelves and slides 4
5. Fitting panels 5

Type Job 2. Clamping
Specific Job a. Building up stock
Operation 1. Clamping and gluing solid tops, panels 1
2. Clamping posts and squares 2
3. Clamping laminated panels and tops 3

Block III
Unit G
Type Job 3

4. Clamping veneers 4
5. Clamping segments 5
6. Using veneer press 6
7. Form clamping 7

Specific Job b. Unit Assembly
Operation 1. Clamping doors and panels 1
2. Clamping ends and backs 2
3. Clamping frames 3
4. Clamping fronts 4
5. Clamping seats 5
6. Clamping drawers and boxes 6

Specific Job c. Final assembly
Operation 1. Clamping and gluing cases 1
2. Clamping and gluing frame furniture 2

Type Job 3. Fastening
Specific Job a. With nails (flat work)
Operation 1. Common nailing 1
2. Finish brad nailing 2

Specific Job b. With screws
Operation 1. Flat screw fastening 1
2. R. H. screw fastening 2
3. Counter bored fastening 3
4. Decorative fastening 4

Specific Job c. With bolts
Operation 1. Lag screw fastening 1
2. Carriage and machine bolt fastening 2

Block III
Unit G
Type Job 4

3. Toilet screw, screw dowell fastening 3
4. Blind bolting 4
5. Expansion and toggle bolting 5

Specific Job d. With patent fastenings
Operation 1. Fastening with corrugated fasteners 1
2. Corner clamp nail fastening 2
3. Fastening with table top fasteners 3
4. Corner angle and plate fastening 4

Type Job 4. Applying Hardware
Specific Job a. Hanging doors
Operation 1. Setting surface hinges 1
2. Setting half-surface hinges 2
3. Setting butt hinges 3
4. Locking cupboard doors 4
5. Locking standard doors 5
6. Setting door bolts 6
7. Applying checks and stops 7

Specific Job b. Applying decorative fittings and pulls
Operation 1. Locking drawers 1
2. Applying pulls and handles 2
3. Applying escutcheons 3
4. Applying ormolu decorations 4

Specific Job c. Applying special hardware and brackets

Block III
Unit H
Type Job 1

Operation 1. Setting shelf fixtures 1
2. Setting brackets 2
3. Setting door slides 3
4. Setting pulleys and balancers 4
5. Setting double acting hinges 5

Type Job 5. Glazing
Specific Job a. Sash
b. Cabinet doors
c. Cases and fixtures
Operation 1. Priming with oil 1
2. Setting glass 2
3. Puttying 3
4. Fitting molding 4
5. Fastening molding 5

Type Job 6. Fixture Setting
Specific Job a. Cupboards
b. Cases and counters
c. Benches and tables
Operation 1. Locating 1
2. Leveling and plumbing 2
3. Scribing and cutting 3
4. Fastening 4
5. Trimming 5
6. Checking 6

Unit H. Joints
Type Job 1. Corner Joints
Specific Job a. Framed panels and fronts
b. Drawers and cases
c. Frame furniture

Block III
Unit H
Type Job 2

Operation 1. Nailed and screwed butt	1	
2. Dowelled butt	2	
3. Rabbet or fillister	3	
4. Through mortise and tenon	4	
5. Blind mortise and tenon	5	
6. Notched	6	
7. Slip tenon in panel groove	7	
8. Miter	8	
9. Hooper	9	
10. Bare-faced tenon	10	
11. Ledge and miter	11	
12. Spline miter	12	
13. Half blind dovetail	13	
14. Open dovetail	14	
15. Stopped lap dovetail	15	
16. End lap	16	
17. Braced	17	

Type Job 2. Edge Joints
Specific Job a. Tops and panels
b. Flooring-sheathing

Operation 1. Glued butt	1	
2. Doweled butt	2	
3. Matched	3	
4. Splined butt	4	

Block III
Unit H
Type Job 4

Type Job 3. Middle Joints
Specific Job a. Framed panels and fronts
b. Framed furniture
Operation 1. Nailed butt 1
2. Doweled butt 2
3. Cross lap 3
4. Middle lap 4
5. Rabbet 5
6. Dado 6
7. Toenailed 7
8. Notched 8
9. Scabbed 9
10. Through mortise and tenon 10
11. Blind mortise and tenon 11
12. Stub mortise and tenon 12
13. Pinned mortise and tenon 13
14. Miter 14
15. Braced 15
16. Middle lap dovetailed 16
17. Wedged mortise and tenon 17

Type Job 4. End Joints
Specific Job a. Molding and trim
b. Flooring and sheathing
c. Fronts and frames
Operation 1. Nailed butt 1
2. Fillister 2
3. End lap bevel 3

Block III
Unit I
Type Job 1

4. Notched	4	
5. Single scarf	5	
6. Double scarf	6	
7. Double scarf keyed	7	
8. Scabbed	8	
9. Miter	9	
10. End matched	10	

Type Job 5. Temporary Joints
Specific Job a. Staging and scaffolding
b. Benches and platforms
c. Bracing stays and shores

Operation 1. Nailed butt	1	
2. X-brace	2	
3. Overlapped	3	
4. Scabbed	4	
5. Toenailed	5	
6. Bolted joints	6	

Unit I. Surface Decoration
Type Job 1. Marquetry and Inlay
Specific Job a. Tops and broad surfaces
b. Rails and narrow surfaces
c. Legs and posts
d. Boxes and caskets

Operation 1. Veining and lining	1	
2. Bandings	2	
3. Applying marquetry	3	
4. Corner veining	4	
5. Applying borders and edging	5	
6. Applying insets	6	

Block III
Unit J
Type Job 1

Type Job 2. Applied
Specific Job a. Broad surfaces
b. Legs and posts
c. Fronts
Operation 1. Applying rosettes 1
2. Applying split turnings 2
3. Applying overlays 3
4. Applying strap work 4
5. Applying moldings and borders 5

Type Job 3. Carving
Specific Job a. Fronts, rails, aprons
b. Legs and posts
c. Decorations and overlays
Operation 1. Line carving 1
2. Strap carving 2
3. Chip carving 3
4. Relief carving 4
5. Sinking surfaces 5

Type Job 4. Veneering (See Clamping, Unit G Type Job 2)
Specific Job a. Tops and flat surfaces
b. Aprons and rails
c. Curved parts
Operation 1. Making and fitting cauls 1
2. Matching and taping 2
3. Applying face veneers and backveneer 3
4. Applying curved veneers 4

Unit J. Laying Out
Type Job 1. Reading Drawings
Specific Job a. Assembly drawings
b. Details
c. Floor plans

Block III
Unit K
Type Job 1

Operation 1. Reading plans 1
2. Reading elevations 2
3. Reading section drawings 3
4. Reading details 4
5. Making sketches from drawings 5

Type Job 2. Layout
Specific Job a. Templates
b. Rods and details
c. Jigs and fixtures
Operation 1. Geometric drawing 1
2. Freehand drawing 2
3. Expanding from scale drawings 3
4. Transferring 4
5. Spiling 5
6. Scribing 6
7. Tracing 7

Type Job 3. Billing
Specific Job a. Estimating jobs
b. Billing for production
Operation 1. Listing on sawyer's cutting bill 1
2. Listing net dimensions 2
3. Listing operation sequence 3
4. Tracing stock in process 4

Unit K. Repairing
Type Job 1. Gluing and Regluing
Specific Job a. Chairs and frames
b. Tables
c. Cases

Block III
Unit L
Type Job 1

Operation 1. Disassembling and cleaning up — 1
2. Split wedge tenoning — 2
3. Gluing and clamping — 3

Type Job 2. Patching
Specific Job a. Surfaces
b. Corners and edges
Operation 1. Fitting and gluing veneer patches — 1
2. Fitting and gluing solid patches — 2
3. Patching with stick shellac, compounds — 3
4. Dovetail patching — 4

Type Job 3. Repair Veneered Work
Specific Job a. Tops and flat surfaces
b. Corners and edges (curved surfaces)
Operation 1. Removing veneers — 1
2. Regluing veneers — 2
3. Regluing marquetry — 3
4. Revencering with cauls — 4

Unit L. Tool Care
Type Job 1. Saw Fitting
Specific Job a. Crosscut saws
b. Ripsaws
c. Special saws
Operation 1. Jointing — 1
2. Shaping teeth — 2
3. Setting — 3
4. Filing — 4
5. Dressing — 5

Block III
Unit L
Type Job 5

Type Job 2. Grinding
Specific Job a. Plane irons
b. Chisels
c. Gouges
d. Cutters
e. Knives
Operation 1. Squaring 1
2. Grinding plain bevel 2
3. Grinding shapes 3

Type Job 3. Whetting
Specific Job a. Plane irons
b. Chisels
c. Gouges
d. Cutters
e. Knives
Operation 1. Whetting plain knives 1
2. Whetting shaped knives 2
3. Whetting with slip stone 3

Type Job 4. Scraper Sharpening
Specific Job a. Hand scraper
b. Cabinet scraper
c. Shaped scraper
Operation 1. Filing 1
2. Whetting 2
3. Burnishing 3
4. Shaping 4

Type Job 5. Cleaning and Adjusting
Specific Job a. Planes
b. Miter boxes
c. Miter cutters
d. Picture frame clamps
Operation 1. Inspecting 1
2. Cleaning and oiling 2
3. Assembling and adjusting 3

Block III
Unit M
Type Job 5

Unit M. Bench Power Tools

Type Job 1. Portable Sanding

Specific Job a. Flat panels and tops
b. Frame panels
c. Assembled work (plain and Curved)

Operation		
1. Flat sanding	1	
2. Edge sanding	2	
3. Right angle grain sanding	3	
4. Curved sanding	4	

Type Job 2. Electric Drilling

Specific Job a. For hardware
b. Screw fastened joints
c. For dowels and bolts

Operation		
1. Screw shank drilling	1	
2. Pilot hold drilling	2	
3. Boring with auger bits	3	

Type Job 3. Electric Screwdriving

Specific Job a. Production work

Operation		
1. Screw fastening	1	

Type Job 4. Bench Jointer Planing

Specific Job a. Same as Unit B, Block I, on small work

Operation		
1. Same as Unit B, Block I on small work	1	

Type Job 5. Bench Circular sawing

Specific Job a. Small bench jobs and fitting

Operation		
1. Ripping	1	
2. Crosscutting	2	
3. Bevel sawing	3	
4. Mitering	4	
5. Dimensioning to length	5	
6. Resawing	6	

Block IV
Unit A
Type Job 1

7. Rabbeting 7
8. Grooving 8
9. Dadoing 9

Type Job 6. Bench Scroll Sawing
Specific Job a. Grills
b. Small profile sawing
c. Enclosee profile sawing
Operation 1. Piece work 1
2. Contour sawing 2
3. Marquetry sawing 3
4. Saber sawing 4
5. Sanding 5

Type Job 7. Portable Routering
Specific Job a. Decorating assembled cases
b. Making joints
Operation 1. Template making 1
2. Grooving 2
3. Dadoing 3
4. Veining and Lining 4
5. Fluting 5
6. Moulding 6

Block IV. Finishing

Unit A. Preparation of Surfaces
Type Job 1. Staining
Specific Job a. Cases
b. Frames
c. Small parts

Block IV
Unit A
Type Job 4

Operation 1. Oil staining — 1
2. Water staining — 2
3. Alcohol aniline staining — 3
4. Chemical staining (Potassium, etc.) — 4
5. Washing and cleaning — 5

Type Job 2. Filling Grain and Holes
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Liquid filling (unprepared) — 1
2. Paste filling — 2
3. Puttying — 3
4. Compound filling and glazing — 4
5. Burning-in with stick shellac — 5

Type Job 3. Sizing and Sealing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Using patent sealers — 1
2. Shellac sealing — 2
3. Glue sizing — 3
4. Varnish sizing — 4

Type Job 4. Finish Removing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Dry scraping and sanding — 1
2. Using liquid removed (dry method) — 2
3. Using liquid removed (wet method) — 3
4. Using blow torch — 4
5. Dipping — 5

Block IV
Unit C
Type Job 1

Unit B. Shellacking
Type Job 1. Brushing
Specific Job a. Cases
b. Frames
c. Small parts

Operation		
1. Brushing tops and wide surfaces	1	
2. Brushing narrow surfaces	2	
3. Brushing spindles and turnings	3	
4. Cutting in	4	

Type Job 2. Spraying
Specific Job a. Cases
b. Frames
c. Small parts

Operation		
1. Spraying tops and wide surfaces	1	
2. Spraying narrow surfaces	2	
3. Spraying spindles and turnings	3	
4. Cutting in with masking tape	4	

Type 3. Dipping
Specific Job a. Small parts

Operation		
1. Preparing material	1	
2. Dipping in tank	2	

Unit C. Varnishing
Type Job 1. Brushing
Specific Job a. Cases
b. Frames
c. Small parts

Operation		
1. Brushing tops and wide surfaces	1	
2. Brushing narrow surfaces	2	
3. Brushing spindles and turnings	3	
4. Cutting in	4	

Block IV
Unit D
Type Job 3

Type Job 2. Spraying
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Spraying tops and wide surfaces 1
2. Spraying narrow surfaces 2
3. Spraying spindles and turnings 3
4. Cutting in with masking tape 4

Type Job 3. Dipping
Specific Job a. Small parts
Operation 1. Preparing materials 1
2. Dipping in tank 2

Unit D. Painting and Enameling
Type Job 1. Brushing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Brushing tops and wide surfaces 1
2. Brushing narrow surfaces 2
3. Brushing spindles and turnings 3
4. Cutting in 4

Type Job 2. Spraying
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Spraying tops and wide surfaces 1
2. Spraying narrow surfaces 2
3. Brushing spindles and turnings 3
4. Cutting in with masking tape 4

Type Job 3. Dipping
Specific Job a. Small parts

Block IV
Unit E
Type Job 3

Operation 1. Preparing material 1
2. Dipping in tank 2

Type Job 4. Stippling
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Two-tone stippling 1
2. Brush stippling 2

Unit E. Texture Finishing
Type Job 1. Plain
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Mixture texture 1
2. Applying base coat 2
3. Forming textures 3

Type Job Two-tone
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Mixing textures 1
2. Applying base and under colors 2
3. Applying and forming top texture 3

Type Job 3. Glazing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Sizing 1
2. Shading 2
3. Rubbing 3
4. Applying fixative glaze 4

Block IV
Unit F
Type Job 3

Type 4 Metallic
Specific Job a. Frames
b. Cases
c. Small parts

Operation		
1. Sizing	1	
2. Shading	2	
3. Rubbing	3	
4. Applying fixative glaze	4	
5. Blowing bronzes	5	

Unit F. Lacquering
Type Job 1. Brushing
Specific Job a. Cases
b. Frames
c. Small parts

Operation		
1. Brushing tops and wide surfaces	1	
2. Brushing narrow surfaces	2	
3. Brushing spindles and turnings	3	
4. Cutting-in with masking tape	4	

Type Job 2. Spraying
Specific Job a. Cases
b. Frames
c. Small parts

Operation		
1. Spraying tops and wide surfaces	1	
2. Spraying narrow surfaces	2	
3. Spraying spindles and turnings	3	
4. Cutting-in with masking tape	4	

Type Job 3. Dipping
Specific Job a. Small parts

Operation		
1. Preparing material	1	
2. Dipping in tank	2	

Block IV
Unit G
Type Job 5

Unit G. Rubbing and Polishing
Type Job 1. Dry Rubbing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Steel wool rubbing between coats 1
2. Sanding between coats 2

Type Job 2. Water Rubbing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Rubbing down with water and pumice stone 1
2. Rubbing with water and sand paper 2
3. Using rubbing brush 3

Type Job 3. Oil Rubbing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Dull rubbing with oil and pumice 1
2. Dull rubbing with oil and steel wool 2

Type Job 4. Polishing
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Polishing with oil and rotten stone 1
2. French polishing 2
3. Wax polishing 3
4. Polishing with patent polishes 4

Type Job 5. Cleaning Up
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Cleaning up with oil 1
2. Cleaning up with gasoline or turpentine 2

Block IV
Unit H
Type Job 5

Unit H. Decoration

Type Job 1. Stenciling

Specific Job a. Cases
b. Frames
c. Small parts

Operation 1. Laying out and making stencils 1 [ ]

2. Brush stenciling 2 [ ]

3. Air brush stenciling 3 [ ]

Type Job 2. Lettering

Specific Job a. Labeling and numbering

Operation 1. Laying out and marking 1 [ ]

2. Plain lettering 2 [ ]

3. Shading 3 [ ]

4. Steel stamp lettering 4 [ ]

Type Job 3. Striping

Specific Job a. Cases
b. Frames
c. Small parts

Operation 1. Straight striping 1 [ ]

2. Scroll striping 2 [ ]

3. Air brush striping 3 [ ]

Type Job 4. Hand Decorating

Specific Job a. Cases
b. Frames
c. Small parts

Operation 1. Laying out and drawing 1 [ ]

2. Copying 2 [ ]

3. Brush decorating 3 [ ]

4. Air brush decorating 4 [ ]

Type Job 5. Decalcomania decorating

Specific Job a. Cases
b. Frames
c. Small parts

Block V
Unit A
Type Job 2

Operation 1. Laying out 1
2. Applying glued transfers 2
3. Applying varnished transfers 3

Type Job 6. Shading
Specific Job a. Cases
b. Frames
c. Small parts
Operation 1. Rub shading with stains 1
2. Two-tone shading with brush and cloths 2
3. Shading with air brush 3

Block V. Upholstering (Optional)

Unit A. Seats
Type Job 1. Slip seats
Specific Job a. Dining and straight chairs
b. Stools
Operation 1. Webbing 1
2. Building up 2
3. Tacking muslin 3
4. Stitching 4
5. Tacking cover 5

Type Job 2. Built-in Webbed Seats
Specific Job a. Dining and straight chairs
b. Stools
Operation 1. Webbing 1
2. Building up 2
3. Stitching edges 3
4. Applying muslin 4
5. Applying cover 5

Block V
Unit B
Type Job 3

Type Job 3. Sprung seats
Specific Job a. Straight chairs
b. Stools
c. Overstuffed chairs and lounges

Operation		
1. Webbing	1	
2. Springing	2	
3. Stitching edges	3	
4. Tacking cover	4	
5. Sewing cover and welts	5	

Type Job 4. Pillow Seats
Specific Job a. Overstuffed chairs

Operation		
1. Cutting cover	1	
2. Sewing cover and welts	2	
3. Stuffing (Interspring)	3	
4. Finishing	4	
5. Stitching buttons	5	

Unit B. Backs
Type Job 1. Plain Backs
Specific Job a. Straight chairs

Operation		
1. Building up	1	
2. Covering	2	

Type Job 2. Webbed Backs
Specific Job a. Straight chairs
b. Lounges

Operation		
1. Webbing	1	
2. Building up (Interspring Unit)	2	
3. Covering	3	

Type Job 3. Sprung Back
Specific Job a. Straight chairs
b. Overstuffed chairs and lounges

Block V
Unit C
Type Job 3

Operation 1. Webbing 1
2. Springing 2
3. Stitching edges 3
4. Tacking cover 4
5. Sewing cover and welts 5

Unit C. Arms
Type Job 1. Solid Arms
Specific Job a. Chairs
b. Lounges
Operation 1. Building up 1
2. Covering 2

Type Job 2. Sprung Arms
Specific Job a. Straight chairs
b. Overstuffed chairs and lounges
Operation 1. Webbing 1
2. Springing 2
3. Stitching edges 3
4. Tacking cover 4
5. Sewing cover and welts 5

Type Job 3. Pillow Arms
Specific Job a. Overstuffed chairs
Operation 1. Cutting cover 1
2. Sewing cover and welts 2
3. Stuffing 3
4. Finishing 4
5. Stitching buttons 5

Block V
Unit D
Type Job 2

Unit D. Panels
Type Job 1. Plain
Specific Job a. Chairs and lounges
Operation 1. Cutting 1

2. Tacking 2

Type Job 2. Padded
Specific Job a. Dining and straight chairs
b. Stools
Operation 1. Webbing 1

2. Building up 2

3. Stitching edges 3

4. Applying muslin and cover 4

COURSE OUTLINE FOR CARPENTRY

CARPENTRY

Unit 1. Preliminary Operations		4 1 3 2
Job 1. Reading plot plans	1	
2. Symbols for materials, part 1	2	
3. Use of scale	3	
4. Specifications, notes, local ordinances	4	
5. Symbols for materials, part 2	5	
6. Foundation loads for soils	6	
7. Examination of building site	7	
8. Building load	8	
9. Soil drainage	9	
Unit 2. Laying Out Building Site		
Job 1. Locating property lines	1	
2. Locating building lines	2	
3. Excavations--Blueprint	3	
4. Use of hand axe and hatchet	4	
5. Use of hand saw (crosscut saw)	5	
6. Use of hammer	6	
7. Setting boards (batter)	7	
Unit 3. Foundations		
Job 1. Foundation blueprints	1	
2. Building forms	2	
3. Setting forms	3	

CARPENTRY

Unit 1. Preliminary Operations

Job 1. Reading plot plans	1	
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Unit 2. Laying Out Building Site

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2. Locating building lines	2	
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5. Use of hand saw (crosscut saw)	5	
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Unit 3. Foundations

Job 1. Foundation blueprints	1	
2. Building forms	2	
3. Setting forms	3	

Job 4. Use of level	4	
5. How to use plumb bob	5	
6. Reinforcing concrete	6	
7. Concrete foundation--blueprint	7	
8. Concrete mixture	8	
9. Curing concrete	9	
10. Concrete piers	10	
11. Brick piers	11	
12. Wood piers	12	

Unit 4. Sills and Girders

Job 1. Blueprints for sills and girders	1	
2. Materials	2	
3. Framing sills	3	
4. Termites and moisture treatment	4	
5. Lining and leveling sills	5	
6. How to use ripsaw	6	
7. How to use wood chisel	7	
8. How to use marking gauge	8	
9. How to use brace and bit	9	
10. Essential parts of steel square	10	

Unit 5. Floor Joists

Job 1. Blueprint reading	1	
2. Floor joist	2	

Job 3. Headers 3

4. Trimmers 4

5. Bathroom joist 5

6. Floor joist load 6

Unit 6. Sub-Floors

Job 1. Blueprint reading 1

2. Sub-floor installation 2

Unit 7. Outer Wall Framing

Job 1. Blueprint reading - outer walls 1

2. Outer Wall frame work 2

3. Corner studs 3

4. Framing corner studs 4

5. Outer and bearing walls 5

6. Framing plates 6

7. Openings and headers - Blueprint reading 7

8. Framing openings and headers 8

9. Frame wall bracing 9

Unit 8. Ceiling Joists

Job 1. Blueprint reading 1

2. Framing and installing 2

3. Bridging 3

Unit 9. Roof Framing

Job 1. Types of roof framing	1	
2. Blueprint readings - Types	2	
3. Blueprint readings - Gables	3	
4. Reading the square - Tables and scales	4	
5. Principles of roof pitches	5	
6. The gable roof	6	
7. A laying out of common rafters	7	
8. Length of common rafters	8	
9. Jack rafters	9	
10. Blueprint reading - Hip rafters	10	
11. How to lay out hip and valley rafters	11	
12. The intersecting roof - Blueprint reading	12	
13. Unequal pitch intersecting roof	13	
14. Blueprint reading - The roof plan	14	
15. Rafter bracing	15	

Unit 10. Outside Covering

Job 1. Outside sheathing	1	
2. Blueprint reading	2	
3. Use of try-square	3	
4. Siding over sheathing	4	
5. Siding over studing	5	
6. Boxing	6	

Job 7. Siding other than wood	7	
8. Use of T-bevel square	8	
9. Scaffolding - Construction	9	

Unit 11. Roof Covering

Job 1. Roof sheathing and lathe	1	
2. Blueprint reading	2	
3. Ridge boards	3	
4. Shingles - Blueprint reading	4	
5. Roof shingles (wood)	5	
6. Asphalt composition shingles	6	
7. Roll Composition roofing	7	
8. Asbestos shingles	8	

Unit 12. Windows and Window Frames

Job 1. Window sash	1	
2. Blueprint reading -- frames and sash	2	
3. Use of screwdriver	3	
4. Use of the plane	4	
5. Window frame and sash	5	
6. Blueprint reading - window trim	6	
7. Window casings	7	

Unit 13. Inside Partitions

Job 1.	Partition studding	1
2.	Door frames	2
3.	Door casings	3
4.	Use of compass saw	4
5.	Frame openings in partitions	5
6.	Use of butt gauge	6
7.	Hanging doors	7

Unit 14. Doors

Job 1.	Doors for inside and outside frames	1
2.	Door frames	2
3.	Door casings	3
4.	Use of coping saw	4
5.	Use of butt gauge	5
6.	Hanging doors	6

Unit 15. Finish Floors

Job 1.	Paper between sub and finish floors	1
2.	Finish floors	2
3.	Finish floors - Blueprint reading	3

Unit 16. Interior Finishes

Job 1.	Interior wall covering	1
2.	Base boards	2
3.	Base and shoe molds	3

Job 4. Picture mold	4	
5. Built-in features - Blueprint reading	5	
6. Use of block plane	6	

Unit 17. Porches and Steps

Job 1. Porch supports	1	
2. Porch joist	2	
3. Porch girders	3	
4. Porch flooring	4	
5. Porch post and columns	5	
6. Outside steps	6	
7. Laying out stringers for steps	7	

REPRESENTATIVE INSTRUCTION SHEETS

PREPARED IN CONFERENCE

FORM USED FOR INSTRUCTION SHEETS

MILL CABINETMAKING COURSE

INSTRUCTION SHEET BLOCK___ UNIT___ TYPE JOB___ OPERATIONS___

TITLE:

AIM:

TOOLS:

EQUIPMENT:

MATERIALS:

NEW INFORMATION:

SAFETY PRECAUTIONS:

DRAWING:

MATHEMATICS:

SCIENCE:

REFERENCES:

PROCEDURE:

QUESTIONS:

Note: If any spacing is insufficient, the proper spacing can be set up when the individual instruction sheet is made and the individual instruction sheet may include as many additional sheets as the particular job may require.

Every Instruction Sheet must be complete within itself, and references may be made only to text books and other similar operations where those operations appear in the same type job.

BIBLIOGRAPHY FOR CARPENTRY COURSE

1. ACB Carpenters and Builders Guide, Audel, 4 Volumes.

2. CA Carpentry, Townsend, American Technical Society, Chicago, Illinois, 1923, $1.50.

3. CAR Carpentry, Griffith, Manual Arts Press, Peoria, Illinois.

4. CBC Building Construction, Hunnington, John Wiley and Son, Inc., New York, N. Y.

5. CBE The Building Estimator Reference Book, Walker, Chicago, Illinois.

6. CBR Blueprint Reading, Parts I and II, American School, Chicago, Illinois.

7. CFC Light Frame House Construction, T. and I. Bulletin No. 41, Superintendent of Documents, G. P. O., Washington, D. C.

8. CHP My House Plans, Finney.

9. CM Carpentry Mathematics, Wilson and Rodgers, McGraw-Hill, New York, N. Y.

10. CRF Roof Framing, Wilson--Werner, McGraw-Hill, New York, N.Y.

11. CSC Atlas Concrete Book, Portland, Portland Cement Company, New York, N. y.

12. CSS Steel Square Pocketbook, Stoddard, Scientific Book Corporation, New York, N. Y.

13. CST Stanley Tool Charts, Stanley Tool Company, New Britton, Connecticut.

INSTRUCTION SHEET NO. I-A-1 (6 Operations)

CUT-OFF SAW

AIM: To help you to learn how to select, layout and cut stock on the cut-off saw.

TOOLS: Rule, pencil, and square.

EQUIPMENT: Cut-off saw.

MATERIAL: A stack of lumber which has been selected for the job.

NEW INFORMATION: Cutting off stock is usually the first operation in the production process. It is done on machines especially designed for the purpose. The machine has a divided table between the parts of which a circular saw can be drawn through the board. The board to be cut is laid on the table. Stop gauges are provided on one half of the table which are adjustable to the desired length of the stock to be cut. There are several types of cut-off saws; the swing type which includes those which swing from above and those which swing from below and the radial cut-off saw and straight line cut-off saw. The swing saw is used exclusively for cutting off stock while the radial saw has a variety of uses in addition to cutting off. The operator of this machine should know its capacity, uses and maintenance.

SAFETY PRECAUTIONS: See that the saw swings clear before turning on the power.
Keep your eyes and mind on your job.
See that the floor and saw table are clear.
Observe the safety lanes.
Stand firm and out of the path of the saw.
If the machine stops running, throw the switch and inform your instructor.
The minimum length of stock to be cut varies. See the instructor for definite information.
Never pull the saw into the wood after the power has been cut off.
For safety of yourself, the machine and other people, never stack directly on the shop floor, because it may pick up rocks, grit, nails, etc., which may damage the machine and injure you and anyone standing near-by.

DRAWING: You must be able to read the drawings or blue-prints with the job, take off the dimensions and check the cutting ticket.

MATHEMATICS: You must be able to read a rule, determine the size of the stock and set the cut-off gauge.

SCIENCE: You must be able to recognize flaws in the lumber, know its working qualities and the effect of the moisture content. You also must be able to recognize when the saw is not cutting as it should.

INSTRUCTION SHEET NO. I-A-I (6 Operations)
(continued)

REFERENCES: C. A. Chap. I -p - 32, 37, 38
P. W. Chap. XVII - p - 246, 247, 248
M. W. pages 32, 34, 35, 36, 37

W. M. Pages 27, 28
W. S. S. Page 78
P. W. Chap. II - Pages 27, 36

PROCEDURE: PERFORM NO OPERATION ON ANY MACHINE WITHOUT A DEFINITE DEMONSTRATION BY THE INSTRUCTOR.

1. Selecting and grading stock. - Inspect and select the lumber to be used for the operation.

2. Laying out lengths economically. - Refer to your blueprint and select lumber of such length that you will have as small an amount of waste as possible in layout length.

3. Cutting off stock singly to a mark. - Mark the stock to the desired length. Place it on the table against the block gauge, start the machine and pull the saw through the board.

4. Cutting off stock one length to gauge. - Perform operation number three above using the gauge.

5. Cutting off stock in multiple lengths (gauge) - Set the gauge stops to the several required lengths and cut off stocks as in the other operations.

6. Cutting off stock on a bevel. - The cutting of stock on a bevel can be done on a cut-off saw by adjusting the table or saw to some desired angle or on other machines by special jogs placed on the table.

QUESTIONS: 1. What is the principle use of the cut-off saw?

2. Name two kinds of cut-off saws and describe the particular kind you have in your shop.

3. How should the material be disposed of after the operation has been performed?

4. Where and how should you stand when operating the cut-off saw?

QUESTIONS:

5. When you are through on the cut-off saw, what is your next step?

6. List the principle safety precautions for the cut-off saw.

7. Where and how do you stack your lumber
   (a) Before cutting?
   (b) After cutting?

8. Why should stock never be laid directly on the shop floor? Why should stock never be walked on?

9. Describe how you would set up a cut-off saw to cut stock to a desired length.

10. Give in order, the operations you have been taught to perform on this particular machine.

11. What is the sawyer's responsibility in regard to the selection of stock used on the job?

INSTRUCTION SHEET NO. I-F-I (6 Operations)

CROSS-CUTTING WITH THE UNIVERSAL SAW

AIM: To help you learn the cross-cutting operations on the Universal Saw.

TOOLS: Rule, marker, and square.

EQUIPMENT: Universal saw with cross-cut saw and cross-cut fences.

MATERIALS: One board stock, not less than 6" wide, 12" long.

NEW INFORMATION: A Universal saw is a type of circular saw designed to do a variety of cutting operations. To operate one of these machines, an operator must be familiar with its capacity, uses and maintenance. Cross-cutting is done with a particular saw - a cross-cut saw. The speed by which the saw can be fed is determined by the revolutions per minute of the arbor, the size of the saw teeth, the hardness of the material to be cut and the diameter of the saw. (Generally, the softer woods are cut with saws of larger teeth.) Every saw should have enough set so as not to pinch and burn the material being cut. Proper allowance should be made in rough dimensions.

SAFETY PRECAUTIONS:
1. See that the machine has been stopped before beginning.
2. See that all guards are in place.
3. Clear the floor and the saw table.
4. Observe Safety Lines.
5. Adjust machine to $\frac{1}{4}$" maximum projection of saw above stock.
6. Stand firm and out of path of saw.
7. Do not crowd the saw.
8. Keep your eyes and your mind on your job.
9. If machine stops running, pull the switch and see the instructor.

DRAWING: You must be able to read drawings and blueprints and take dimensions off them; mark stock; check cutting tickets and interpret scales.

MATHEMATICS: You must be able to read a rule; know fractional measurements; check all dimensions and measurements and set the cut-off gauges.

SCIENCE: You must be able to recognize flaws in the lumber and understand the effect of seasoning on lumber.

REFERENCES: M. W. Chapter III, Page 55
M. S. S. Pages 94 to 110
W. M. Pages 15 to 23

PROCEDURE: PERFORM NO OPERATION ON ANY MACHINE WITHOUT A DEFINITE DEMONSTRATION BY THE INSTRUCTOR.

1. Squaring one end of a board. This consists of selecting the best end of the board, holding it firmly against the fence and pushing it against the saw.

2. Cross-cutting to the mark. Cut off waste stock to the outside of the mark (DTM P 13).

3. Dimension cross-cutting to the cut-off block. Allow for clearance and cut off stock by use of the cut-off block on the ripping fence (W.S.S. p 95).

4. Dimension Cross-cutting. Same procedure as number three with the gauge. Cut off stock to dimension by the use of the cut-off gauge on the cut-off fence.

5. Notching. (Cross-cut and Rip saw) Notching is a series of cross-cutting for ratchets and is done by tilting the saw or table to produce angle cutting using cut-off gauges.

6. Dimension Sawing. (Gauges and Yokes) This is handling two adjustments with the same set-up without changing the gauges.

QUESTIONS: 1. What are the purposes of the Universal saw and what are its limitations?

2. How does a circular cross-cut saw differ from a circular rip saw?

3. What will be the results of using a saw that is not in proper condition?

4. List four safety precautions in order of importance to be observed in operating the Universal saw in Cross-cutting.

5. Name six cross-cutting operations on the Universal saw.

QUESTIONS:

6. What new information have you learned about cross-cutting on the Universal saw? Give at least ten new operations which this lesson has taught you.

7. How do you determine the proper end to start the operation of cross-cutting?

8. How much allowance should be made in cutting stock to rough dimensions?

9. What would you do, should the machine stop running?

10. What position should the operator assume while operating the Universal Saw?

Appendix E

PROGRESS CHART

Student's Individual Progress Record for Mill Cabinetmaking Course

Issued by

THE BUREAU OF INDUSTRIAL TEACHER-TRAINING
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SHOP INDIVIDUAL INFORMATION SUMMARY

DATE ENTERED _____

Name _____ Grade Completed on Entering _____

Age Entered _____ Age Graduated _____ Age Dropped _____

Personal Qualities Rating (Subjective)

Rate: Poor, Fair, Excellent

Industry _____ Interest _____ Care of tools and equipment _____

Dependability on entering _____ Resourcefulness on entering _____

Improvement shown later _____ Sociability _____ Leadership _____

Subordination to authority _____ Attitudes: Toward other pupils _____ Toward the teacher _____ Toward the job _____ Toward the school _____ Toward the government _____ Most interest and proficiency in _____ Department.

General Information

Parent's name _____ Address _____

Name of school _____ Shop _____

Home room teacher _____ Shop teacher _____

Day-trade or part-time participation and when and where _____

Remarks: _____

MILL CABINETMAKING COURSE

C o n t e n t s

PROGRESS CHART

FOR MC 1

MILL CABINETMAKING COURSE

I	BLOCK I MACHINE OPERATIONS			
A-1	Unit A The Cut-off Saw Type Job 1 Rough Sawing			
1	Selecting and grading stock			
2	Laying out lengths economically			
3	Cutting off stock singly to a mark			
4	Cutting off stock one length (gauge)			
5	Cutting off stock in multiple lengths (gauge)			
6	Cutting off stock on a bevel			
B-1	Unit B The Jointer Type Job 1 Edge Jointing			
1	Facing			
2	Jointing first edge			
3	Bevel edge jointing			
4	Chamfering			
5	End jointing			
6	Glue jointing			
B-2	Type Job 2 Surface Jointing			
1	Surface planing to remove wind or warp			
2	Planing strips (fingerboard)			
3	Rabbeting			
4	Taper planing			
5	Diagonal planing			
C-1	Unit C Surface or Thickness Planer Type Job 1 Dimensioning to Thickness			
1	Dimension planing (thickness)			
2	Diagonal planing			
3	Planing thick stock on a rider			
C-2	Type Job 2 Dimensioning to Width			
1	Dimension or bunch planing (width)			
D-1	Unit D Ripsaw Type Job 1 Ripping Flatwise			
1	Plain ripping			
2	Dimension ripping (Planer Saw)			
3	Resawing			
4	Bevel ripping on table			
5	Bevel ripping on fence			
6	Notching crosscut and ripping (ripsaw)			
7	Dimension sawing loose panel stock			
8	Dimension sawing glued-up panels			
9	Dimension sawing square panels			
10	Sawing to a line (sweeps and bevels)			
11	Strip ripping (fingerboard)			
D-2	Type Job 2 Ripping Bevelwise			
1	Bevel ripping on table			
2	Bevel ripping on fence			
3	Compound beveling			

I	Unit E Variety Saw				
E-1	Type Job 1 Crosscutting				
1	Dimension sawing				
2	Bevel crosscutting (mitering)				
3	Squaring one end				
4	Crosscutting to mark				
5	Dimension crosscutting (CO block)				
6	Dimension crosscutting (CO gauge)				
7	Notching (crosscut and ripsaw)				
8	Dimension sawing (gauges and yokes)				
E-2	Type Job 2 Ripsawing				
1	Plain ripping				
2	Dimension ripping (planer saw)				
3	Resawing				
4	Bevel ripping on table				
5	Bevel ripping on fence				
6	Notching (crosscut and ripsaw)				
7	Dimension sawing loose panel stock				
8	Dimension sawing glued-up panels				
9	Dimension sawing square panels				
10	Strip ripping (fingerboard)				
11	Cutting off stock				
E-3	Type Job 3 Bevel Sawing				
1	Bevel ripping on table				
2	Compound beveling				
3	Surface dovetailing for cleats				
4	Wedge sawing				
5	Taper sawing with taper jig				
6	Segment sawing				
	Unit F Universal Saw				
F-1	Type Job 1 Crosscutting				
1	Squaring one end				
2	Crosscutting to mark				
3	Dimension crosscutting (CO block)				
4	Dimension crosscutting (CO gauge)				
5	Notching (crosscut and ripsaw)				
6	Dimension sawing (gauges and yokes)				
F-2	Type Job 2 Ripsawing				
1	Plain ripping				
2	Dimension ripping (planer saw)				
3	Resawing				
4	Bevel ripping on table				
5	Bevel ripping on fence				
6	Notching crosscut and ripsaw				
7	Dimension sawing loose panel stock				
8	Dimension sawing glued-up panels				
9	Dimension sawing square panels				
10	Sawing sweeps and bevels to a line				
11	Strip ripping (fingerboard)				
F-3	Type Job 3 Bevel Sawing				
1	Bevel ripping on table				
2	Compound beveling				
3	Surface dovetailing for cleats				
4	Wedge sawing				
5	Taper sawing with taper jig				
6	Segment sawing				

F-4	Type Job 4 Rabbeting				
1	Rabbeting (two cuts)				
2	Fillister cutting (two cuts)				
3	Rabbeting (dado head)				
4	Fillister cutting (dado head)				
5	End or edge dovetailing				
F-5	Type Job 5 Grooving and plowing				
1	Grooving (ripsaw)				
2	Grooving (dado head)				
3	Circular routing (core box)				
4	Grooving on bevel				
F-6	Type Job 6 Dadoing or routing				
1	Dadoing (crosscut saw)				
2	Dadoing (dado head)				
3	Notching (dado head)				
4	Dadoing on bevel				
F-7	Type Job 7 Tenon sawing				
1	Tenoning with dado head				
2	Slip tenon cutting				
3	Shouldered tenon cutting				
F-8	Veining and lining				
1	Veining and lining corners				
2	Veining and lining flat surfaces				
3	Veining and lining edges				
4	Veining and lining curved surfaces				
F-9	Type Job 9 Shaping				
1	Shaping circular edges				
2	Shaping straight edges				
3	Shaping strips and mouldings				
4	Fluting				
F-10	Type Job 10 Novelty cutting				
1	Sawing banding and inlay lines				
2	Sawing spirals				
Unit G	Dimension or Trimmer Saw (Table Type)				
G-1	Type Job 1 Dimension cutting tonet length				
1	Squaring one end				
2	Crosscutting to mark				
3	Dimension crosscutting (CO gauge)				
4	Bevel crosscutting (mitering)				
5	Dimension sawing glued up panels				
6	Dimension sawing squared panels				
	Unit H Mortiser				
H-1	Type Job 1 Longitudinal mortising				
1	Blind mortising longitudinally				
2	Through mortising				
3	Slip mortising				
4	Notching				
5	Sinking Surfaces				
6	Locating duplicate mortises				
7	Changing chisels and bits				
8	Bevel mortising and boring				
H-2	Type Job 2 Transverse mortising				
1	Blind mortising transversally				
2	Through mortising				
3	Notching				

I-H-2	(Cont'd) Transverse mortising				
4	Gaining-dadoing-housing				
5	Locating duplicate mortises				
6	Changing chisels and bits				
H-3	Type Job 3 Routing				
1	Routing				
2	Gaining-dadoing-housing				
3	Sinking surfaces				
4	Changing chisels and bits				
H-4	Type Job 4 Boring				
1	Changing chisels and bits				
2	Through boring				
3	Depth boring				
4	Countersinking and boring				
5	Locating duplicate holes				
6	Angle boring				
	Unit I Boring Machine				
I-1	Type Job 1 Edge boring				
1	Changing chisels and bits				
2	Through boring				
3	Depth boring				
4	Countersinking and boring				
5	Locating duplicate holes				
6	Angle boring				
I-2	Type Job 2 Flat boring				
1	Changing chisels and bits				
2	Through boring				
3	Depth boring				
4	Countersinking and boring				
5	Locating duplicate holes				
6	Angle boring				
I-3	Type Job 3 End boring				
1	Changing chisels and bits				
2	Depth boring				
3	Countersinking and boring				
4	Locating duplicate holes				
I-4	Type Job 4 Routing				
1	Changing chisels and bits				
2	Through routing mortises				
3	Depth routing mortises				
	Unit J Tenoner				
J-1	Type Job 1 Flat tenoning				
1	Slip tenoning cheek cutting				
2	Cutting tongues				
3	Cutting rabbets and fillisters				
4	Dimension sawing to length				
5	Offset shouldering				
6	Flat beveled tenons				
J-2	Type Job 2 Edge tenoning				
1	Edge shouldering				
2	Haunched tenoning				
3	Notching				
4	Edge beveled tenons				
J-3	Type Job 3 Coped tenoning				
1	Cutting coped tenons				

	Unit K Disc Sander				
K-1	Type Job 1 End grain sanding				
1	Straight end grain sanding				
2	Beveled end grain sanding				
3	Curved end grain sanding				
4	Flat bevel sanding				
5	Edge bevel sanding				
6	Spindle end sanding				
K-2	Type Job 2, Edge grain sanding				
1	Straight edge sanding				
2	Curved edge sanding				
3	Flat bevel sanding				
4	Edge bevel sanding				
K-3	Type Job 3 Fitting				
1	Drawer fitting				
2	Door and panel fitting				
	Unit L Belt Sander				
L-1	Type Job 1 Flat sanding				
1	Narrow surface sanding				
2	Wide surface sanding				
3	Sanding right angle grains (assembled)				
4	Assembled case sanding				
L-2	Type Job 2 Edge sanding				
1	Straight edge sanding				
2	Curved edge sanding				
L-3	Type Job 3 Caul and form block sanding				
1	Curved sanding				
2	Concaved sanding				
3	Shaped sanding				
	Unit M Drum Sander (Single)				
M-1	Type Job 1 Flat sanding				
1	Narrow surface sanding				
2	Wide surface sanding				
3	Assembled case sanding				
M-2	Type Job 2 Edge sanding				
1	Straight edge sanding				
2	Curved edge sanding				
3	Flat bevel sanding				
4	Edge bevel sanding				
5	Convex sanding				
6	Concave sanding				
	Unit N Turning Lathe				
N-1	Type Job 1 Preparing stock				
1	Centering spindle stock				
2	Centering face plate stock				
N-2	Type Job 2 Spindle turning				
1	Parallel spindle turning				
2	Taper turning				
3	Shoulder spindle turning				
4	Concave spindle turning				
5	Convex spindle turning				
6	Scrape turning				
7	Skew cut turning				
8	Color combination turning				
9	Split turning				
10	Ring turning (loose)				
N-3	Type Job 3 Plain face plate turning				
1	Dowel fitting				

N-3-2	Edge face plate turning				
3	Straight surface face plate turning				
4	Concave face plate turning				
5	Convex face plate turning				
6	Dish turning				
7	Color combination turning				
8	Bull-end face plate turning				
9	Glue chuck turning				
10	Ring turning (loose)				
N-4	Type Job 4 Special face plate turning				
1	Ring turning (friction clutch)				
2	Knob turning				
3	Dish turning				
4	Veining				
5	Inlaying				
6	Glue chuck turning				
N-5	Type Job 5 Spiral turning				
1	Spiral turning layout				
2	Sawing and roughing				
3	Carving				
4	Smoothing				
N-6	Type Job 6 Boring				
1	Plug cutting				
2	Straight spindle boring (chuck)				
3	Plain boring (chuck)				
4	Dowel fitting				
N-7	Type Job 7 Novelty turning				
1	Glue chuck turning				
2	Ring turning (locse)				
3	Ring turning (friction chuck)				
4	Thurming				
N-8	Type Job 8 Sanding and polishing				
1	Spindle sanding				
2	Face plate sanding				
3	Filling				
4	Oil polishing				
5	French polishing				
N-9	Type Job 9 Tool sharpening and care				
1	Shaping				
2	Grinding				
3	Whetting				
	Unit 0 Shaper				
0-1	Type Job 1 Sticking edge mouldings				
1	Setting up solid cutters				
2	Setting up knife cutters				
3	Molding straight edged (sticking)				
4	Molding concaved edges (sticking)				
5	Moulding convex edges (sticking)				
6	Molding inside frame edges				
7	Shaping with templates				
8	Panel raising				
0-2	Type Job 2 Sticking sprung and flat mldgs				
1	Straight sticking				
2	Convex sticking				
3	Concave sticking				
4	Setting up solid cutters				
5	Setting up knife cutters				
6	Fluting				
7	Reeding				
8	Shaping with template				
0-3	Type Job 3 Sticking Joints				

I-0-3-1	Setting up solid cutters				
2	Setting up knife cutters				
3	Grooving				
4	Rabbeting and fillistering				
5	Tonguing				
6	Glue jointing				
7	Dovetailing				
0-4	Type Job 4 Tenoning				
1	Tenoning with saws				
2	Tenoning with cutters				
3	Coping				
0-5	Type Job 5 Shaping with dividing head				
1	Setting up solid Cutters				
2	Setting up knife cutters				
3	Fluting				
4	Reeding				
5	Shaping with templates				
	Unit P. Router (Stationary and Portable)				
P-1	Type Job 1 Sinking Surfaces				
1	Pin and template routing				
2	Cut out template routing				
3	Freehand routing to line				
P-2	Type Job 2 Mortising				
1	Mortising to line				
2	Mortising with template				
3	Pin and template mortising				
4	Mortising with jig				
P-3	Type Job 3 Fretwork				
1	Freehand				
2	Pin and template				
3	With template				
P-4	Type Job 4 Sticking Moldings				
1	Freehand				
2	With template				
P-5	Type Job 5 Inlaying, Veining, and Lining				
1	Freehand				
2	With template				
3	Pin and template				
P-6	Type Job 6 Dovetailing				
1	With dovetail template				
2	Dadoing				
3	Grooving				
	Unit Q Spindle Carver				
Q-1	Type Job 1 Flat Carving				
1	Line carving				
2	Sunken and chip carvings				
3	Relief carving				
Q-2	Type Job 2 Turned Carving				
1	Line carvings				
2	Sunken and chip carvings				
3	Relief carvings				
	Unit R Bandsaw				
R-1	Type Job 1 Contour Sawing				
1	Cut planing				
2	Circular sawing outside curves				
3	Circular sawing inside curves				
4	Sawing reverse curves				
5	Multiple sawing				
R-2	Type Job 2 Dimension Sawing				
1	Ripping to a line				
2	Crosscutting to a line				
3	Resawing, using square				

I-R-2-4	Resawing using jig				
5	Cut planing (Multiple)				
R-3	Type Job 3 Bevel sawing				
1	Cut planing				
2	Diagonal splitting of stock				
3	Bevel sawing (table tilted)				
R-4	Type Job 4 Jig and template sawing				
1	Cut planing				
2	Resawing using jig				
3	Splitting spindles and round stock(cutting box)				
4	Shaped sawing to pattern-jig				
5	Sawing circles (radius jig)				
	Unit S Molder and Sticker				
S-1	Type Job 1 Moldings				
1	Setting up				
2	Feedings				
3	Offbearings				
S-2	Type Job 2 Dimension shapes				
1	Setting up				
2	Feeding				
3	Offbearing				
	Unit T Drill Press				
T-1	Type Job 1 Mortising				
1	Mortising to a line				
2	Mortising with template				
3	Pin and template mortising				
4	Mortising with a jig				
T-2	Type Job 2 Boring				
1	Changing chisels and bits				
2	Through boring				
3	Depth Boring				
4	Countersinking and boring				
5	Locating duplicate holes				
T-3	Type Job 3 Shaping				
1	Shaping circular edges				
2	Shaping straight edges				
3	Shaping strips and moldings				
4	Fluting				
5	Reeding				
T-4	Type Job 4 Routing				
1	Changing chisels and bits				
2	Through routing mortises				
3	Depth routing mortises				
T-5	Type Job 5 Carving				
1	Line carvings				
2	Sunken and chip carvings				
3	Relief carving				
T-6	Type Job 6 Dovetailing				
1	Open				
2	Blind				
3	With dovetail template				
4	Dadoing				
5	Grooving				
T-7	Type Job 7 Spindle sanding				
1	Curved edge sanding				
2	End sanding				
3	Edge sanding				
4	Fretwork sanding				

I	Unit U Jig Saw or Scroll Saw				
U-1	Type Job 1 Straight lines sawing				
1	Selecting and changing saw blades				
2	Dimensioning to length				
3	Dimensioning to width				
4	Fretting				
U-2	Type Job 2 Circular sawing				
1	Selecting and changing saw blades				
2	Resawing using jig				
3	Shaped sawing to pattern-jig				
4	Circular fretting				
U-3	Irregular Sawing Type Job 3				
1	Changing saw blades				
2	Resawing using jig				
3	Shaped sawing to pattern-jig				
4	Combination fretting				
5	Multiple sawing				
II	BLOCK II MAINTENANCE WORK (Millwright work)				
	Unit A Lubrication				
A-1	Type Job 1 Greasing				
1	Filling grease cups				
2	General inspection				
3	Using Alemite fittings				
4	Using Zerk fittings				
A-2	Type Job 2 Oiling				
1	Filling oil cups				
2	General inspection				
3	Filling reservoir or self-oiler				
	Unit B Setting up and adjusting				
B-1	Type Job 1 Circular Saws				
1	Set up and adjust circular saws				
2	Set up and change dado cutters				
3	Set up and change molding heads				
B-2	Type Job 2 Scroll Jig Saws				
1	Setting and adjusting blades				
2	Adjusting guides				
B-3	Type Job 3 Bandsaws				
1	Setting and adjusting blades				
2	Adjusting guides and rollers				
3	Cleaning guides and rollers				
4	Setting up special jigs and fixtures				
5	Replacing rubber bands				
6	Coiling blades				
7	Cleaning rubber bands				
B-4	Hollow Chisel Mortiser;Borer Type Job 4				
1	Setting up and adjusting bits and chisels				
2	Adjusting table,fittings,and jigs				
3	Filing bits and chisels				
4	Grinding drills				
B-5	Type Job 5 Tenoner				
1	Setting tenon knives				
2	Setting cope cutters				
3	Aligning carriage				
4	Setting carriage fittings				
5	Aligning gibbed ways				
B-6	Type Job 6 Planers				
1	Setting Knives				

II-B-6	(Continued) Planers				
2	Aligning rollers				
3	Adjusting chip breaker				
4	Aligning table				
5	Aligning shoe or platen				
B-7	Type Job 7 Sanders				
1	Adjusting tables				
2	Adjusting disc				
3	Adjusting Drum				
4	Affixing paper				
5	Splicing abrasive belts				
6	Setting jigs				
B-8	Type Job 8 Routers				
1	Adjusting head and chuck				
2	Setting cutters				
3	Setting jigs				
B-9	Type Job 9 Spindle Carvers				
1	Adjusting head and chuck				
2	Setting cutters				
3	Setting jigs				
	Unit C Grinding				
C-1	Type Job 1 Machine knives and cutters				
1	Straight grinding in machine				
2	Straight grinding loose flat knives				
3	Laying out flat shaped knives				
4	Grinding shaped flat knives				
5	Grinding solid cutters				
6	Drawing and tempering				
	Unit D Grinding Saws				
D-1	Type Job 1 Circular Saws				
1	Jointing				
2	Gumming				
3	Sharpening				
	Unit E Saw Fitting by Hand				
E-1	Type Job 1 Bandsaws				
1	Jointing				
2	Gumming				
3	Filing				
4	Setting				
5	Dressing				
6	Brazing				
E-2	Type Job 2 Circular Saws				
1	Jointing				
2	Gumming				
3	Filing				
4	Setting				
5	Swaging				
6	Dressing				
7	Hammering				
	Unit F Power Transmission				
F-1	Type Job 1 Belt Drives				
1	Figuring speeds				
2	Selecting belt				
3	Fitting belt				
4	Splicing				
5	Tracking belts				
6	Tightening belts				

II F-2	Type Job 2 Gear Drives				
1	Figure speeds				
2	Align and adjust				
3	Fit keyway				
4	Tighten loose gears				
5	Replacing gears				
F-3	Type Job 3 Friction drives				
1	Align and adjust				
2	Renew faces				
3	True faces				
	Unit G Power Supply				
G-1	Type Job 1 Electric motors				
a-1	Check voltage				
2	Select size				
3	Check speed				
b-1	Replace brushes				
2	Adjust brushes				
c-1	Clean commutators				
2	Resurface commutators				
d-1	Clean switches				
2	Adjust switches				
3	Replace switch parts				
4	Connect switches				
e-1	Check bearings				
2	Replace balls and races				
3	Replace bronze bearings				
	Unit H Machine Setting				
H-1	Type Job 1 Floor plan layout				
1	Measuring for location				
2	Measuring elevations				
3	Locating fastenings				
H-2	Type Job 2 Foundations				
a-1	Excavating and soil testing for concrete				
2	Form building for concrete				
3	Reinforcing				
4	Setting bolts				
5	Pouring and finishing				
b-1	Laying out timber				
2	Setting timber				
3	Fastening timber				
c-1	Setting metal sub-foundation				
2	Laying out and drilling				
3	Setting and bolting				
H-3	Type Job 3 Leveling				
1	Getting elevations				
2	Wedging				
3	Grouting				
4	Bolting				
H-4	Type Job 4 Assembling				
1	Inspecting				
2	Adjusting				
3	Painting inaccessible places				
4	Fastening				
	Unit I Cleaning				
I-1	Type Job 1 Overall Cleaning				
1	Disassembling				
2	Soaking				

II-I-1	Overhaul Cleaning Type Job 1				
3	Scraping and brushing				
4	Chipping				
5	Repainting				
I-2	Inspection Cleaning Type Job 2				
1	Brushing and wiping				
2	Scraping				
3	Blowing off				
4	Inspection				
III	BLOCK III BENCH WORK (Cabinetmaking)				
	Unit A Sawing				
A-1	Type Job 1 Crosscutting				
a-1	Square crosscutting to dimension				
2	Bevel crosscutting				
b-1	Square crosscutting joints				
2	Beveled crosscutting joints				
3	Shouldered crosscutting joints				
c-1	Square crosscutting fitted parts				
2	Square ripping				
3	Shoulder crosscutting				
4	Kerf crosscutting				
A-2	Type Job 2 Ripping				
1	Resawing				
2	Square ripping				
3	Bevel ripping				
4	Kerf ripping				
A-3	Type Job 3 Beveling				
1	Flat mitering				
2	Edge mitering				
3	Compound mitering				
4	Mitering in box				
A-4	Type Job 4 Circumferential				
1	Keyhole sawing				
2	Compass sawing				
3	Coping curved shapes				
4	Coping of molding				
5	Turning sawing				
	Unit B Planing				
B-1	Type Job 1 Edge				
1	Scrub planing				
2	Jointing				
3	Dimension planing				
4	Curved edge planing				
5	Straight end planing				
6	Curved end planing				
B-2	Type Job 2 Surface				
1	Scrub planing				
2	Truing				
3	Smoothing				
4	Dimension planing				
5	Tooth planing				
B-3	Type Job 3 Shaped				
1	Sticking molding				
2	Matching				
3	Rabbet planing				
4	Router planing				
5	Core box planing				

III-B-3	Shaped Planing Type Job 3 (Cont'd)				
6	Bead planing				
7	Chamfer planing				
8	Shoot Planing				
	Unit C Scraping				
C-1	Type Job 1 Hand Steel Scraping				
a-1	Cleaning up				
2	Surface hand scraping				
3	Surface push scraping				
b-1	Cleaning up joint intersections				
2	Surface hand scraping				
3	Surface push scraping				
c-1	Shaped scraping of moldings				
	Unit D Smoothing and Preparing for Finish				
D-1	Type Job 1 Sanding				
1	Block sanding				
2	Folded paper sanding				
3	Shaped sanding				
4	Tempering				
D-2	Type Job 2 Filing				
1	Flat filing				
2	Curved filing				
	Unit E Boring				
E-1	Type Job 1 Brace and bit				
a-1	Through boring (Decorations and all parts)				
2	Depth boring				
3	Bevel boring				
b-1	Through boring for Joints				
2	Depth boring for Joints				
3	Bevel boring for Joints				
E-2	Type Job 2 Hand drill				
1	Through				
2	Depth				
3	Bevel				
E-3	Type Job 3 Electrical drill				
1	Through boring				
2	Depth boring				
3	Bevel boring				
4	Countersinking				
5	Counter-boring				
	Unit F Chiseling				
F-1	Type Job 1 Firmer				
1	Roughing				
2	Bottoming				
3	Shouldering				
4	Paring				
5	Mortising				
F-2	Type Job 2 Gouging				
1	Inside gouging				
2	Outside gouging				
	Unit G Assembling				
G-1	Type Job 1 Fitting				
1	Fitting joints				
2	Fitting doors				
3	Fitting drawers				
4	Fitting shelves and slides				
5	Fitting panels				

III-G-2	Type Job 2 Clamping				
a-1	Clamping and gluing solid tops, panels				
2	Clamping posts and squares				
3	Clamping laminated panels and tops				
4	Clamping veneers				
5	Clamping segments				
6	Using veneer press				
7	Form clamping				
b-1	Clamping doors and panels				
2	Clamping ends and backs				
3	Clamping frames				
4	Clamping fronts				
5	Clamping seats				
6	Clamping drawers and boxes				
c-1	Clamping and gluing cases (Final assmby)				
2	Clamping and gluing frame furniture				
G-3	Type Job 3 Fastening				
a-1	Common nailing (flat work)				
2	Finish brad nailing				
b-1	Flat screw fastening				
2	R.H.screw fastening				
3	Counter bored fastening				
4	Decorative fastening				
c-1	Lag screw fastening				
2	Carriage and machine bolt fastening				
3	Toilet screw and screw dowell fastening				
4	Blind bolting				
5	Expansion and toggle bolting				
d-1	Fastening with corrugated fasteners				
2	Corner clamp nail fastening				
3	Fastening with table top fasteners				
4	Corner angle and plate fastening				
G-4	Type Job 4 Applying Hardware				
a-1	Setting surface hinges for hanging doors				
2	Setting half-surface hinges				
3	Setting butt hinges				
4	Locking cupboard doors				
5	Locking standard doors				
6	Setting door bolts				
7	Applying checks and stops				
b-1	Locking drawers				
2	Applying pulls and handles				
3	Applying escutcheons				
4	Applying ormolu decorations				
c-1	Setting shelf fixtures				
2	Setting brackets				
3	Setting door slides				
4	Setting pulleys and balancers				
5	Setting doubleacting hinges				
G-5	Type Job 5 Glazing				
1	Priming with oil				
2	Setting glass				
3	Putting				
4	Fitting molding				
5	Fastening molding				

III-G-6	Fixture Setting Type Job 6				
1	Locating				
2	Leveling and plumbing				
3	Scribing and cutting				
4	Fastening				
5	Trimming				
6	Checking				
	Unit H Joints				
H-1	Type Job 1 Corner Joints				
1	Nailed and screwed butt				
2	Dowelled butt				
3	Rabbet or fillister				
4	Through mortise and tenon				
5	Blind mortise and tenon				
6	Notched				
7	Slip tenon in panel groove				
8	Miter				
9	Hooper				
10	Bare-faced tenon				
11	Ledge and miter				
12	Spline miter				
13	Half blind dovetail				
14	Open dovetail				
15	Stopped lap dovetail				
16	End lap				
17	Braced				
H-2	Type Job 2 Edge Joints				
1	Glued butt				
2	Doweled butt				
3	Matched				
4	Splined butt				
H-3	Type Job 3 Middle Joints				
1	Nailed butt				
2	Doweled butt				
3	Cross lap				
4	Middle lap				
5	Rabbet				
6	Dado				
7	Toenailed				
8	Notched				
9	Scabbed				
10	Through mortise and tenon				
11	Blind mortise and tenon				
12	Stub mortise and tenon				
13	Pinned mortise and tenon				
14	Miter				
15	Braced				
16	Middle lap dovetailed				
17	Wedged mortise and tenon				
H-4	Type Job 4 End Joints				
1	Nailed butt				
2	Fillister				
3	End lap bevel				
4	Notched				
5	Single scarf				
6	Double scarf				
7	Double scarf keyed				

III-H-4	End Joints Type Job 4 (Cont'd)				
8	Scabbed				
9	Miter				
10	End Matched				
H-5	Type Job 5 Temporary Joints				
1	Nailed butt				
2	X-Brace				
3	Overlapped				
4	Scabbed				
5	Toenailed				
6	Bolted joints				
	Unit I Surface Decoration				
I-1	Type Job 1 Marquetry and Inlay				
1	Veining and lining				
2	Bandings				
3	Applying Marquetry				
4	Corner veining				
5	Applying borders and edging				
6	Applying insets				
I-2	Type Job 2 Applied				
1	Applying rosettes				
2	Applying split turnings				
3	Applying overlays				
4	Applying strap work				
5	Applying moldings and borders				
I-3	Type Job 3 Carving				
1	Line carving				
2	Strap carving				
3	Chip carving				
4	Relief carving				
5	Sinking surfaces				
I-4	Type Job 4 Veneering				
1	Making and fitting cauls				
2	Matching and taping				
3	Applying face veneers and backveneers				
4	Applying curved veneers				
	Unit J Laying Out				
J-1	Type Job 1 Reading Drawings				
1	Reading plans				
2	Reading elevations				
3	Reading section drawings				
4	Reading details				
5	Making sketches from drawings				
J-2	Type Job 2 Layout				
1	Geometric drawing				
2	Freehand drawing				
3	Expanding from scale drawings				
4	Transferring				
5	Spiling				
6	Scribing				
7	Tracing				
J-3	Type Job 3 Billing				
1	Listing on sawyer's cutting bill				
2	Listing net dimensions				
3	Listing operation sequence				
4	Tracing stock in process				

III	Unit K Repairing				
K-1	Type Job 1 Gluing and regluing				
1	Disassembling and cleaning up				
2	Split wedge tenoning				
3	Gluing and clamping				
K-2	Type Job 2 Patching				
1	Fitting and gluing veneer patches				
2	Fitting and gluing solid patches				
3	Patching with stick shellac, compounds				
4	Dovetail patching				
K-3	Type Job 3 Repair Veneered Work				
1	Removing veneers				
2	Regluing veneers				
3	Regluing marquetry				
4	Reveneering with cauls				
	Unit L Tool Care				
L-1	Type Job 1 Saw Fitting				
1	Jointing				
2	Shaping teeth				
3	Setting				
4	Filing				
5	Dressing				
L-2	Type Job 2 Grinding				
1	Squaring				
2	Grinding plain bevel				
3	Grinding shapes				
L-3	Type Job 3 Whetting				
1	Whetting plain knives				
2	Whetting shaped knives				
3	Whetting with slip stone				
L-4	Type Job 4 Scraper Sharpening				
1	Filing				
2	Whetting				
3	Burnishing				
4	Shaping				
L-5	Type Job 5 Cleaning and Adjusting				
1	Inspecting				
2	Cleaning and oiling				
3	Assembling and adjusting				
	Unit M Bench Power Tools				
M-1	Type Job 1 Portable Sanding				
1	Flat sanding				
2	Edge sanding				
3	Right angle grain sanding				
4	Curved sanding				
M-2	Type Job 2 Electric Drilling				
1	Screw shank drilling				
2	Pilot hold drilling				
3	Boring with auger bits				
M-4	Type Job 4 Bench Jointer Planing				
1	Same as Unit B, Block I on small work				
M-3	Type Job 3 Electric Screwdriving				
1	Screw fastening				
M-5	Type Job 5 Bench Circular Sawing				
1	Ripping				
2	Crosscutting				

III-M-5	(Contd)Type Job 5 Bench Circular Sawing				
3	Bevel sawing				
4	Mitering				
5	Dimensioning to length				
6	Resawing				
7	Rabbeting				
8	Grooving				
9	Dadoing				
M-6	Type Job 6 Bench Scroll Sawing				
1	Piercing work				
2	Contour sawing				
3	Marquetry sawing				
4	Saber sawing				
5	Sanding				
M-7	Type Job 7 Portable Routering				
1	Template making				
2	Grooving				
3	Dadoing				
4	Veining and lining				
5	Fluting				
6	Molding				
IV	BLOCK IV FINISHING				
	Unit A Preparation of Surfaces				
A-1	Type Job 1 Staining				
1	Oil staining				
2	Water staining				
3	Alcohol aniline staining				
4	Chemical staining (potassium,etc.)				
5	Washing and cleaning				
A-2	Type Job 2 Filling Grains and Holes				
1	Liquid filling (unprepared)				
2	Paste filling				
3	Puttying				
4	Compound filling and glazing				
5	Burning-in with stick shellac				
A-3	Type Job 3 Sizing and Sealing				
1	Using patent sealers				
2	Shellac sealing				
3	Glue sizing				
4	Varnish sizing				
A-4	Type Job 4 Finish Removing				
1	Dry scraping and sanding				
2	Using liquid remover(dry method)				
3	Using liquid remover(wet Method)				
4	Using blow torch				
5	Dipping				
	Unit B Shellacking				
B-1	Type Job 1 Brushing				
1	Brushing tops and wide surfaces				
2	Brushing narrow surfaces				
3	Brushing spindles and turnings				
4	Cutting in				
B-2	Type Job 2 Spraying				
1	Spraying tops and wide surfaces				
2	Spraying narrow surfaces				
3	Spraying spindles and turnings				
4	Cutting-in with masking tape				

IV-B-3	Type Job 3 Dipping				
1	Preparing materials				
2	Dipping in tank				
	Unit C Varnishing				
C-1	Type Job 1 Brushing				
1	Brushing tops and wide surfaces				
2	Brushing narrow surfaces				
3	Brushing spindles and turnings				
4	Cutting-in				
C-2	Type Job 2 Spraying				
1	Spraying tops and wide surfaces				
2	Spraying narrow surfaces				
3	Spraying spindles and turnings				
4	Cutting-in with masking tape				
C-3	Type Job 3 Dipping				
1	Preparing materials				
2	Dipping in tank				
	Unit D Painting and Enameling				
D-1	Type Job 1 Brushing				
1	Brushing tops and wide surfaces				
2	Brushing narrow surfaces				
3	Brushing spindles and turnings				
4	Cutting-in				
D-2	Type Job 2 Spraying				
1	Spraying tops and narrow surfaces				
2	Spraying narrow surfaces				
3	Spraying spindles and turnings				
4	Cutting-in with masking tape				
D-3	Type Job 3 Dipping				
1	Preparing material				
2	Dipping in tank				
D-4	Type Job 4 Stippling				
1	Two-tone stippling				
2	Brush stippling				
	Unit E Texture Finishing				
E-1	Type Job 1 Plain				
1	Mixing texture				
2	Applying base coat				
3	Forming textures				
E-2	Type Job 2 Two-tone				
1	Mixing textures				
2	Applying base and under colors				
3	Applying and forming top texture				
E-3	Type Job 3 Glazing				
1	Sizing				
2	Shading				
3	Rubbing				
4	Applying fixative glaze				
E-4	Type Job 4 Metallic				
1	Sizing				
2	Shading				
3	Rubbing				
4	Applying fixative glaze				
5	Blowing bronzes				

IV	Unit F Lacquering				
F-1	Type Job 1 Brushing				
1	Brushing tops and wide surfaces				
2	Brushing narrow surfaces				
3	Brushing spindles and turnings				
4	Cutting-in with masking tape				
F-2	Type Job 2 Spraying				
1	Spraying tops and wide surfaces				
2	Spraying narrow surfaces				
3	Spraying spindles and turnings				
4	Cutting-in with masking tape				
F-3	Type Job 3 Dipping				
1	Preparing material				
2	Dipping in tank				
	Unit G Rubbing and Polishing				
G-1	Type Job 1 Dry Rubbing				
1	Steel wool rubbing between coats				
2	Sanding between coats				
G-2	Type Job 2 Water Rubbing				
1	Rubbing down with water and pumice stone				
2	Rubbing with water and sand paper				
3	Using rubbing brush				
G-3	Type Job 3 Oil Rubbing				
1	Rubbing with oil and pumice (Dull Finish)				
2	Dull rubbing with oil and steel wool				
G-4	Type Job 4 Polishing				
1	Polishing with oil and rotten stone				
2	French polishing				
3	Wax polishing				
4	Polishing with patent polishes				
G-5	Type Job 5 Cleaning Up				
1	Cleaning up with oil				
2	Cleaning up with gasoline or turpentine				
	Unit H Decoration				
H-1	Type Job 1 Stenciling				
1	Laying out and making stencils				
2	Brush stenciling				
3	Air brush stenciling				
H-2	Type Job 2 Lettering				
1	Laying out and marking				
2	Plain lettering				
3	Shading				
4	Steel stamp lettering				
H-3	Type Job 3 Striping				
1	Straight striping				
2	Scroll striping				
3	Air brush striping				
H-4	Type Job 4 Hand Decorating				
1	Laying out and drawing				
2	Copying				
3	Brush decorating				
4	Air brush decorating				
H-5	Type Job 5 Decalcomania Decorating				
1	Laying out				
2	Applying glued transfers				
3	Applying varnished transfers				

IV-H-6	Type Job 6 Shading				
1	Rub shading with stains				
2	Two-tone shading with brush and cloths				
3	Shading with air brush				
V	BLOCK V UPHOLSTERING (Optional)				
	Unit A Seats				
A-1	Type Job 1 Slip Seats				
1	Webbing				
2	Building up				
3	Tacking muslin				
4	Stitching				
5	Tacking cover				
A-2	Type Job 2 Built-in Webbed Seats				
1	Webbing				
2	Building up				
3	Stitching edges				
4	Applying muslin				
5	Applying cover				
A-3	Type Job 3 Sprung Seats				
1	Webbing				
2	Springing				
3	Stitching edges				
4	Tacking covers				
5	Sewing cover and welts				
A-4	Type Job 4 Pillow Seats				
1	Cutting cover				
2	Sewing cover and welts				
3	Stuffing (Innerspring)				
4	Finishing				
5	Stitching buttons				
	Unit B Backs				
B-1	Type Job 1 Plain Backs				
1	Building up				
2	Covering				
B-2	Type Job 2 Webbed Backs				
1	Webbing				
2	Building up (Innerspring)				
3	Covering				
B-3	Type Job 3 Sprung Back				
1	Webbing				
2	Springing				
3	Stitching edges				
4	Tacking cover				
5	Sewing cover and welts				
	Unit C Arms				
C-1	Type Job 1 Solid Arms				
1	Building up				
2	Covering				
C-2	Type Job 2 Sprung Arms				
1	Webbing				
2	Springing				
3	Stitching edges				
4	Tacking cover				
5	Sewing cover and welts				
C-3	Type Job 3 Pillow Arms				
1	Cutting cover				
2	Sewing cover and welts				
3	Stuffing				
4	Finishing				
5	Stitching buttons				

Appendix F

JOB ANALYSIS SHEET

Form No. I

JOB ANALYSIS SHEET

Job No. _____. Job Name _____ Company _____.
Department _____. Occupation _____ No. Employed on Job __
Prepared by _____ Date Made _____.

JOB DESCRIPTION OF
WHAT WORKER DOES

I. CHARACTER OF JOB
1. Routine.....
2. Repetitive.....
3. Automatic.....
4. Slow.....
5. Medium .....
6. Rapid.....
7. Varied tasks.....

II. TYPE OF WORK
1. Heavy.....
2. Light.....
3. Medium.....
4. Inside.....
5. Outside.....
6. Hazardous.....

III. EXPOSURE
1. Heat.....
2. Cold.....
3. Dry.....
4. Wet.....
5. Smoke.....
6. Oil.....
7. Fumes.....
8. Explosives.....
9. Dust.....
10. Acids.....
11. Altitudes.....
12. Special.....

IV. HEALTH HAZARDS
1. Poisons.....
2. Vibrations.....
3. Noise.....
4. Nerves.....
5. Eyestrain.....

V. PHYSICAL REQUIREMENTS (JOBS).
1. Standing.....
2. Sitting.....
3. Moving.....
4. Stooping.....
5. Walking.....
6. Climbing.....
7. Reaching.....
8. Lifting.....
9. Rapid temperature changes.....

VI. PHYSICAL REQUIREMENTS (Personal)
1. Weight.....
2. Height.....
3. Strength.....
4. Eyesight.....
5. Hearing.....
6. General Health.....
7. Sex.....
8. Age prefered.....

VII. MENTAL REQUIREMENTS
1. Read.....
2. Write.....
3. Spell.....
4. Mathematics.....
5. Write English.....
6. Speak English.....

VIII ABILITIES - EXECUTIVE.
1. Instruct others.....
2. Handle men.....
3. Leadership.....
4. Supervisory.....

IX. ABILITIES-MANIPULATIVE SKILL
1. Skilled.....
2. Semi-skilled.....
3. Unskilled.....

X. ABILITIES-TECHNICAL KNOWLEDGE
1. Drafting.....
2. Blueprints.....
3. Technical, Instruments.....
4. Engineering.....
5. Materials.....
6. Equipment.....
7. Supplies.....
8. Business.....

XI. ABILITIES-CLERICAL
1. Typing.....
2. Dictation.....
3. Bookkeeping.....
4. Filing.....
5. Telephone.....
6. Multigraph.....
7. Mimeograph.....
8. Adding Machine.....
9. Addressograph.....
10. Comptometer.....
11. Dictaphone.....

XII. PREVIOUS EXPERIENCE REQUIRED
1. Nature.....
2. Length.....
3. Degree of skill.....

XIII. TIME TO TRAIN
1. Experienced workers.....
2. Inexperienced workers.....

XIV. TRAINING AVAILABIE
1. None.....
2. Limited.....
3. Complete.....
4. Available elsewhere.....

XV. GRADE OF INTELLIGENCE REQUIRED.
1. High.....
2. Medium.....
3. Low.....

XVI. PERSONAL QUALITIES
1. Accuracy.....
2. Neatness.....
3. Speed.....
4. Initiative.....
5. Personality.....
6. Honesty.....
7. Reliability.....
8. Appearance.....
9. Memory.....
10. Leadership.....
11. Tact.....
12. Agressiveness.....
13. Alertness.....

XVII. RESPONSIVILITIES
1. Handle money...
2. Records.....
3. Equipment.....
4. Routine.....
5. Directed.....
6. Follow orders only.....
7. Supervisory....

XVIII. CONTACTS
1. With public....
2. Other workers..
3. Correspondence.
4. Telephone.....

XIX. EMPLOYMENT CONDITIONS
1. Permanent.....
2. Part time.....
3. Temporary.....
4. Intermittent..

XX. PERSONAL EQUIPMENT REQUIRED.
1. Tools.....
2. Clothing.....
3. Other equipmen

XXI. WORKING CONDITIONS
1. Hours per day.
2. Starting time.
3. Quitting time.
4. Wages.....
a. Per Hr.....
b. Per day....
c. Per wk.....
d. Piece work.
e. Bonus.....
f. Commission.
5. Wages-when pai
a. Daily.....
b. Weekly....
c. Semi-month
d. Monthly....

XXII. PROMOTION
1. Eligible.....
2. Possible.....
3. Not likely...
4. Time.....
5. Next job.....

XXIII. EDUCATIONAL REQUIREMENTS
1. Grade school.
2. High School..
3. Vocational...
4. Technical....
5. College.....

XXIV. MISCELLANEOUS

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