A STUDY TO DETERMINE THE NEED FOR AND
THE POSSIBILITIES OF OFFERING
INDUSTRIAL EDUCATION IN
TERRE HAUTE, INDIANA

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS .................................................. ii
LIST OF TABLES .......................................................... v
I. INTRODUCTION .......................................................... 1
II. OCCUPATIONAL DISTRIBUTION OF INDUSTRIAL
    EMPLOYEES IN TERRE HAUTE IN 1931 ......................... 5
III. PRESENT INDUSTRIAL EDUCATION PROGRAM IN
    TERRE HAUTE ......................................................... 15
IV. EFFICIENCY OF VOCATIONAL EDUCATION IN TERRE
    HAUTE AS REVEALED BY STUDENTS COMPLETING THE
    TRAINING FROM 1920 - 1930 .................................... 18
V. MANUFACTURING
    A. Automobile Mechanics ......................................... 27
    B. Bakers .................................................................. 30
    C. Coal Mining .......................................................... 33
    D. Core Makers .......................................................... 36
    E. Furniture and Cabinet Makers ................................. 38
    F. Machinists .......................................................... 41
    G. Molders .............................................................. 45
    H. Patternmaking ..................................................... 48
    I. Power Sewing Machine Operators .............................. 51
    J. & K. Sheet Steel Punch Press Operators
        and Scale Assemblers ........................................... 55
    L. Welders .............................................................. 58
VI. THE BUILDING TRADES

A. Bricklayers ........................................... 59
B. Carpenter's Summary Findings .................... 61
C. Electricians ............................................. 65
D. Painters .................................................. 69
E. Plasterers ................................................ 71
F. Plumbers .................................................. 74
G. Sheet Metal Workers .................................. 78
H. Structural Iron Workers .............................. 81

VII. PRINTING OCCUPATIONS ............................. 84

VIII. RAILROAD OCCUPATIONS ........................... 88

IX. CONCLUSION AND RECOMMENDATIONS FOR INDUSTRIAL
    ARTS AND INDUSTRIAL VOCATIONAL WORK .......... 93
    A. Industrial Arts ....................................... 94
    B. Industrial Vocational Education ................. 96

X. APPENDIX

A. Bibliography ........................................... 109
B. Letter Sent Out With Questionnaires ............ 110
C. Copy of Questionnaire Sent to Graduates of
    Gerstmeyer Technical High School ................. 111
D. Employer Questionnaire ............................... 112
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Coal Mining Operations Carried on in Terre Haute District During 1928-1929</td>
<td>7</td>
</tr>
<tr>
<td>II. Strip Mining Operations Carried on in Terre Haute District During 1928-1929</td>
<td>8</td>
</tr>
<tr>
<td>III. Wages Paid Skilled and Unskilled Workmen at Present Time</td>
<td>9-10</td>
</tr>
<tr>
<td>IV. Occupational Distribution of Industrial Employees in Manufacturing Industry in Terre Haute for April, 1931</td>
<td>11</td>
</tr>
<tr>
<td>V. Occupational Distribution of Industrial Employees in Building Trades in Terre Haute for April, 1931</td>
<td>12</td>
</tr>
<tr>
<td>VI. Occupational Distribution of Industrial Employees in Railroad Industry in Terre Haute for April, 1931</td>
<td>13</td>
</tr>
<tr>
<td>VII. Occupational Distribution of Industrial Employees in Printing Trades in Terre Haute for April, 1931</td>
<td>13</td>
</tr>
<tr>
<td>VIII. Training Received by Students who are not Now Engaged in the Vocation for Which They Took Training</td>
<td>19</td>
</tr>
<tr>
<td>IX. Training Received by Students Who Are Now Unemployed</td>
<td>20</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

Purpose of Study

The study reported in the following pages was carried on to summarize present practices in industrial education and to learn how this program may be improved and made to meet the needs of boys and girls attending school in Terre Haute. The study was also carried on with a view to promoting a closer relationship between the Gerstmeyer Technical High School and the various industries of the city. In order to realize this goal to better advantage the writer has been working in cooperation with Mr. Stantz, Principal of Gerstmeyer Technical High School and Mr. Huntington, Teacher Trainer of the Indiana State Teachers College, in making this survey of the present program of industrial work offered in the city schools, and in collecting other data to be used in making vocational education more effective in the future.

Another purpose of this study has been to learn from local employers and employees of the possibilities of training boys for and up-grading men in those vocations for which the greatest number of employees were found in Terre Haute. In carrying out this phase...
of the study every opportunity was used to learn of ways in which the schools could co-operate with industry in putting on a stronger vocational education program. The writer also attempted to learn of the reactions of employers and employees to attempts on the part of school authorities to teach any of the trade classes offered by the city schools.

Method of Securing Data

Those interested in making this study thought that trade training in Terre Haute might be improved if graduates were called upon to offer suggestions as to ways in which they might have secured more effective help while in training. The questionnaire found in the appendix was mailed out to some two hundred graduates of Gerstmeyer who comprised the total list for the past ten years. These reports gave some indication also as to the number of graduates who have worked in the vocation for which they had taken their training. A summary of their replies has been included later in this study. The questionnaires were sent out through Mr. Huntington because the writer felt that more effective results probably could be obtained by working through the Indiana State Teachers College.

At the time this study was started the 1930 United States census reports for Terre Haute were not
available. Instead of referring to the 1920 census figures for the occupational distribution of employees in Terre Haute, employers were called upon for their present and normal lists of employees and these figures were used in connection with reports from the local labor union officials, wherever such an organization existed. An example of the method employed in determining the number of employees per occupation is taken from the report of the carpenters' trade. The union officials report a membership of one hundred seventy-four members while the employers report that the carpenters are organized about eighty percent, which brings the total number of carpenters to two hundred twenty for Terre Haute at the present time. The same method was used to determine the total number of employees in all the fields reported in this study. The 1930 United States census reports later became available and a careful check was made with the reports that were made as stated above. Such minute variations were found that the writer presents the material as originally compiled.

Information was collected per occupation by submitting a copy of the questionnaire, found in the appendix of this study, to two representative employers and to the labor union officials or to two representative workmen in the trade where no union ex-
listed. All employers were called upon personally to obtain their list of employees so a total estimate could be made of all employees per occupation. The reports for each occupation, or industry, included in this study thus represent a summary of the present reactions of persons engaged in the vocations summarized. It is hoped that some of these studies may lead to improved conditions in industrial arts and industrial vocational education in Terre Haute in the near future.

No summary has been included in this report for those occupations which have a present membership of less than twelve individuals, since those interested in these findings were concerned with possibilities of improving those groups most in need and in a position to be assisted in the near future. Further study of possibilities for aiding other occupations will need to follow this study as opportunities arise whereby the city might put on more vocational education.
II. OCCUPATIONAL DISTRIBUTION OF INDUSTRIAL EMPLOYEES

FOUND IN TERRE HAUTE IN 1931

Terre Haute, founded in 1816 together with the state of Indiana, is situated on the east bank of the Wabash River midway between its source and its mouth. The city has had a steady growth in population from 579 in 1828 to 66,083 in 1920. In 1930\(^1\) the population is given as 62,543. In addition there should be included 8,093 people who live in the same township immediately outside the city limits. This gives a total of 70,636, which tends to uphold the gradual increase in population that has been the history of the community since its beginning.

The city has nineteen elementary schools with an enrollment of 6,606, nineteen kindergartens with an enrollment of 1,070, three junior high schools enrolling 1,782 and three high schools enrolling 2,584 students, which makes a total enrollment of 12,042 in the public schools. In addition to the city public schools the Indiana State Teachers College is located here. This

institution had an enrollment of 4,668 different persons in residence for the school year ending in June, 1930. Rose Polytechnic Institute, a private engineering school of the highest order, and St. Mary-of-the-Woods, a college for young women, are both located near the city limits and enroll an increasing number of students each year.

The city is located on the main lines, east and west, of the Pennsylvania and New York Central lines and the main line, north and south, of the Chicago and Eastern Illinois. It is also served by the Chicago, Milwaukee, St. Paul and Pacific, and the Indiana Railway, a Traction line which operates interurban facilities between Terre Haute and Indianapolis for both passengers and freight. Two national highways pass through the city, U. S. Highway 40 running east and west and U. S. Highway 41 running north and south, thus connecting the city easily with many communities in this section of the state.

The state of Indiana has more than 3,000,000,000 tons of workable bituminous coal, of which 2,550,000,000 tons are in five counties comprising the Terre Haute
district. During the year ending September, 1929\(^2\) the following coal mining operations were carried on in this district:

<table>
<thead>
<tr>
<th>County</th>
<th>Tons Mined</th>
<th>Wages Paid</th>
<th>Miners Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>421,891</td>
<td>$546,452.51</td>
<td>379</td>
</tr>
<tr>
<td>Greene</td>
<td>808,457</td>
<td>883,035.87</td>
<td>947</td>
</tr>
<tr>
<td>Sullivan</td>
<td>2,212,454</td>
<td>3,068,083.27</td>
<td>2512</td>
</tr>
<tr>
<td>Vermillion</td>
<td>1,800,944</td>
<td>2,507,502.43</td>
<td>1814</td>
</tr>
<tr>
<td>Vigo</td>
<td>3,561,122</td>
<td>4,663,563.72</td>
<td>3126</td>
</tr>
</tbody>
</table>

\(^2\)Industrial Survey of Terre Haute, Indiana. - 1930

Chamber of Commerce. p.1
Strip mining added the following activities for the same period:

TABLE II

STRIP MINING OPERATIONS CARRIED ON IN TERRE HAUTE DISTRICT DURING 1928-1929

<table>
<thead>
<tr>
<th>County</th>
<th>Tons Mined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>753,056</td>
</tr>
<tr>
<td>Greene</td>
<td>595,225</td>
</tr>
<tr>
<td>Sullivan</td>
<td>622,058</td>
</tr>
<tr>
<td>Vermillion</td>
<td>371,235</td>
</tr>
<tr>
<td>Vigo</td>
<td>215,865</td>
</tr>
</tbody>
</table>

Within the last year or two this situation has been materially reduced because of economic changes in this industry, hence many men who have followed this vocation have been forced to seek other employment. The following summary shows present conditions
in the majority of occupations followed by skilled and unskilled employees:

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Wages per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam engineers</td>
<td>$1.00</td>
</tr>
<tr>
<td>Foremen</td>
<td>$1.30</td>
</tr>
<tr>
<td>Common labor (male)</td>
<td>40¢</td>
</tr>
<tr>
<td>Common labor (female)</td>
<td>17 to 48¢</td>
</tr>
<tr>
<td>Machinist</td>
<td>50 to 90¢</td>
</tr>
<tr>
<td>Machinist helpers</td>
<td>40 to 65¢</td>
</tr>
<tr>
<td>Blacksmiths (welders)</td>
<td>50 to 75¢</td>
</tr>
<tr>
<td>Blacksmiths helpers</td>
<td>40 to 50¢</td>
</tr>
<tr>
<td>Tinners and sheet metal workers</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

Industrial Survey of Terre Haute, Indiana - 1930
Chamber of Commerce. p. 13
Table III. (Continued)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenters</td>
<td>$1.00</td>
</tr>
<tr>
<td>Painters</td>
<td>65 to 90¢</td>
</tr>
<tr>
<td>Pattern makers</td>
<td>$1.00</td>
</tr>
<tr>
<td>Electricians</td>
<td>42 to 90¢</td>
</tr>
<tr>
<td>Millwright</td>
<td>45 to 60¢</td>
</tr>
<tr>
<td>Boiler makers</td>
<td>70 to 90¢</td>
</tr>
<tr>
<td>Bricklayers</td>
<td>$1.50</td>
</tr>
<tr>
<td>Plasterers</td>
<td>$1.50</td>
</tr>
<tr>
<td>Cement finishers</td>
<td>$1.50</td>
</tr>
<tr>
<td>Structural steel workers</td>
<td>$1.25</td>
</tr>
</tbody>
</table>

Piece work payment is used in many of the local industries and the prevailing hours of work per week are forty-eight to sixty.

The summary of findings regarding the occupational distribution of industrial employees in Terre Haute for April, 1931, include the following:
# Table IV

**Occupational Distribution of Industrial Employees in Manufacturing Industry in Terre Haute**

*For April, 1931*

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Employer's List</th>
<th>Union List</th>
<th>Percent Organized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Mechanics</td>
<td>120 - 150</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Bakers</td>
<td>51</td>
<td>80</td>
<td>.95</td>
</tr>
<tr>
<td>Coal Miners</td>
<td></td>
<td>765</td>
<td>100</td>
</tr>
<tr>
<td>Core Makers</td>
<td>20 - 30</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Furniture and Cabinet Makers</td>
<td></td>
<td>33</td>
<td>.00</td>
</tr>
<tr>
<td>Machinists</td>
<td>75 - 130</td>
<td>40</td>
<td>.50</td>
</tr>
<tr>
<td>Molders</td>
<td>105 - 225</td>
<td>10</td>
<td>.01</td>
</tr>
<tr>
<td>Pattern Makers</td>
<td>35 - 40</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Power Sewing Machine Operators</td>
<td>350 - 450</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Scale Assemblers</td>
<td>35</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Steel Pressmen and Assemblers</td>
<td>32</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>Welders (Blacksmiths)</td>
<td>35</td>
<td></td>
<td>.00</td>
</tr>
</tbody>
</table>
### Table V

**Occupational Distribution of Industrial Employees**

**In Building Trades in Terre Haute**

**For April, 1931**

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Employer's List</th>
<th>Union List</th>
<th>Percent Organized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bricklayers</td>
<td>100 - 135</td>
<td>90</td>
<td>.90</td>
</tr>
<tr>
<td>Carpenters</td>
<td>225</td>
<td>174</td>
<td>.75</td>
</tr>
<tr>
<td>Electricians</td>
<td>30 - 45</td>
<td>20</td>
<td>.40</td>
</tr>
<tr>
<td>Painters</td>
<td>100 - 200</td>
<td>68</td>
<td>.40</td>
</tr>
<tr>
<td>Plasterers</td>
<td>65</td>
<td>55</td>
<td>.75</td>
</tr>
<tr>
<td>Plumbers</td>
<td>25 - 60</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>Sheet Metal Workers</td>
<td>30 - 60</td>
<td>20</td>
<td>.66</td>
</tr>
<tr>
<td>Structural Iron Workers</td>
<td>12 - 15</td>
<td>12 - 15</td>
<td>100</td>
</tr>
</tbody>
</table>
### TABLE VI

**OCCUPATIONAL DISTRIBUTION OF INDUSTRIAL EMPLOYEES**

**IN RAILROAD INDUSTRY IN TERRE HAUTE**

**FOR APRIL, 1931**

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Employer's List</th>
<th>Union List</th>
<th>Percent Organized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler Makers</td>
<td>25</td>
<td>18</td>
<td>.75</td>
</tr>
<tr>
<td>Car-repairmen</td>
<td>87</td>
<td>65</td>
<td>.75</td>
</tr>
<tr>
<td>Machinists</td>
<td>52</td>
<td>40</td>
<td>.75</td>
</tr>
<tr>
<td>Welders</td>
<td>6</td>
<td>4</td>
<td>.75</td>
</tr>
</tbody>
</table>

### TABLE VII

**OCCUPATIONAL DISTRIBUTION OF INDUSTRIAL EMPLOYEES**

**IN PRINTING TRADES IN TERRE HAUTE**

**FOR APRIL, 1931**

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Employer's List</th>
<th>Union List</th>
<th>Percent Organized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compositors, Pressmen and Paper Cutters</td>
<td>128</td>
<td>135</td>
<td>.50</td>
</tr>
</tbody>
</table>
Other occupations are found in Terre Haute which include many unskilled employees, but for the purpose of this study they have not been enumerated since the writer was in search of occupations for which some training might profitably be given as a part of the trade training program of the community.

The material which follows gives a summary of the present industrial education program which is followed by the detailed findings regarding the training needs and possibilities for the vocations listed above.
III. PRESENT INDUSTRIAL EDUCATION PROGRAM IN TERRE HAUTE

A summary of the work being carried on in industrial education in the city schools will establish a point of departure for improving this work in the future as well as aid in establishing a more acceptable philosophy to guide the work in this entire field.

In the elementary schools of the city, industrial arts work is offered in the seventh and eighth grades at Deming school, a school located in the manufacturing district of the city. This work consists largely of try-out work in sheet metal, bench metal, printing, foundry, electricity, mechanical drawing, concrete, and some work in wood. Boys are routed through this work so they get four activities per year for the two years. Such a program is likewise carried out in the junior high schools of the city, namely, Woodrow Wilson, Sarah Scott, and McLean with the exception that in these schools the boys get a longer time to devote to each of the activities taught. These courses aid many boys in making more intelligent selections of future training than would be the case where no such opportunities were provided them, as is
evidenced by statements made by boys who take up industrial arts or trade training in the high schools.

In Garfield, one of the four-year high schools of the city, boys are given work in bench metal, pattern making, foundry, woodwork and drawing, while at Wiley High School more stress is laid on mechanical and architectural drawing and woodwork. This work is all offered as industrial arts work and has little bearing on what might be taught in the junior high school courses. This condition is being corrected as rapidly as possible so that the work of the seventh, eighth and ninth grades serves as an introduction to that carried on in the later years.

The industrial work offered at the Gerstmeyer Technical High School includes both industrial arts and trade training courses. The activities offered include printing, architectural drawing, machine shop, blacksmithing, automobile mechanics, carpentry, patternmaking, foundry, and electrical work. Most of the industrial education teachers in this school teach one-half time industrial arts work and one-half time trade work in their respective fields. The industrial arts work is offered to boys who expect to graduate from high school, many of whom will continue on to college. The trade training offered is a two-year program given
to fourteen and fifteen year-old boys although some are enrolled above those years. The school authorities at Gerstmeyer are encouraging boys, enrolled in the trade course, to stay with their school work until they graduate from the four-year high school course. This program requires these boys to take two additional years of work beyond that specified in their trade training program and is proving quite helpful to these boys when they become eligible for employment. It was indicated by the replies received that, heretofore, the employers of the community have not been highly interested in the trade training these boys received in school, but they were more interested in having high school graduates than non-graduates. The employers are now looking into the previous training of such boys more and more, and much of the credit for this change has been due to the trade teachers employed at Gerstmeyer.

One of the greatest needs for improving this program is now being met as rapidly as possible in that the entire program of industrial arts and trade training is being co-ordinated and correlated so that it provides an opportunity for boys taking work in this field to secure more valuable training and more extensive training in any field than has been the case in the past.
IV. EFFICIENCY OF VOCATIONAL EDUCATION IN TERRE HAUTE AS REVEALED BY STUDENTS COMPLETING THIS TRAINING FROM 1920 - 1930

In a study of the present industrial vocational education taught in Terre Haute, the writer attempted to secure a summary of certain facts, from the graduates of Gerstmeyer Technical High School for the past ten years, to see what light these data might throw on the status of this program.

A questionnaire, see Appendix B, was sent to some two hundred persons and from the fifty replies received it was found that four were following the vocation for which they had received training at Gerstmeyer and forty-six were not. Such a situation needs further study to do justice to the educational program in Terre Haute.

One boy who is now working at the trade for which he took training is employed in a machine shop, after completing two years training in 1929. Two others are working at the electrical trade after finishing the two-year course in 1925 and the four-year course in 1928 respectively. Another has been working in a local garage after finishing a two-year auto mechanics course in 1930.
A study of the replies from those graduates who are not now following the vocation for which they took training will show their training to include the following:

**TABLE VIII**

**TRAINING RECEIVED BY STUDENTS WHO ARE NOT NOW ENGAGED IN THE VOCATION FOR WHICH THEY TOOK TRAINING**

<table>
<thead>
<tr>
<th>Date Completed Training</th>
<th>Auto Mechanics</th>
<th>Pattern Making</th>
<th>Machinist</th>
<th>Woodwork</th>
<th>Printing</th>
<th>Electrical</th>
<th>No Course Specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>1925</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1926</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1927</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>1928</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td>11</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>1929</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td>11</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>1930</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A survey of the replies from those graduates who are not now employed would be quite misleading if more careful study of the replies were not included here. The value of the training received at Gerstmeyer is variously rated by these boys when a survey is made of the jobs they have had since completing their two-year training program.
Fourteen of these boys have taken training in auto mechanics and, while not now employed in the trade for which they received training, only four have never worked in this field since leaving school. The others have been working at the trade when they could secure employment. Some have spent considerable time as mechanics, others as truck drivers, some as service station attendants, as chauffeurs, and one has been in business since completing his training in 1928. The present business depression, seemingly, has a decided effect on the status of these boys who have recently completed their training. Others have not entered the trade for which they took their training because they found they did not like the work.

Of the five boys who took electrical training, none has followed that work because he could not find such employment. These boys have been employed much of the time since completing their training but this employment has been of the casual kind.

In the case of the boys who took printing, four replies were received. Three of these boys have worked at the trade part of the time since completing their work at Gerstmeyer, but the recent business depression came on and they were laid off. The other boy did not like the work so never tried to get employment in this line but has been working in the baking industry ever
since completing his school work.

The three boys who took carpentering at Gerst­
meyer tell a similar story: one did not like the work
after completing it, one worked at the trade until he
was laid off and then took up truck-driving, and the
third worked at the trade until his employer quit
business.

In patternmaking the boys implied that they did
not like the work after completing it, or that they
did not know how to secure employment in this trade
after they had completed their training.

Three boys had taken machine shop training but
have been unable to secure employment largely because
work in this field did not exist when they were ready
for employment and also because they did not know how
to find such employment.

Considerable assistance for those in charge of
our education in Terre Haute might easily be received
from the reactions of these graduates to the question
regarding the manner in which they received their first
job after leaving school. The answers to this question
include the following:

**Manner in Which Graduates Obtained First Job.**

An acquaintance aided sixteen boys in getting emplo­
ment, ten boys secured their first job by personal
efforts only, shop teachers aided six boys, two boys
continued in work they had been carrying part-time while attending school, relatives aided six boys in obtaining their first jobs, while two boys secured their first jobs through newspaper advertisements. These results show that the school placement program has some room for improvement.

The Relationship Existing Between Courses Taken and Courses Desired Later. Little relationship is in evidence between the course of study taken by these boys and the additional training in which they are now interested. Such a situation would also point to a weakness in the present training system since few of these boys seem to have reached any definite attitude toward industrial employment. However, most of the boys feel that they have received ample aid in selecting their school training program. One boy said he made his decision as to a trade, while at school, because the school authorities asked him to and not because he knew how to do so in the best manner. This factor might make it advisable for the school authorities to look into the possibilities of postponing vocational training until the third and fourth year of high school instead of offering it the first and second years. Since these boys are largely graduates of the two-year trade training courses only,
they reported that the lack of a complete high school education had little effect on their ability to secure employment except in the fields of printing and automobile repair.

**Suggestions Offered by Students.** These graduates offer various suggestions for improving the work offered at Gerstmeyer Technical High school, such as the following:

- Abolish technical instructors and replace with practical instructors.
- Co-operate with instead of fighting trade unions.
- A four-year vocational course would be more practical than a two-year course.
- Get teachers who also stress honesty, confidence, and sportsmanship.
- Practical book studying along with manipulative work in shop.
- Add a course in welding to meet present day demands.
- Instructors should be men trained to teach as well as be good workmen.
- Add some work in aviation.
- Establish more clubs to help acquaint student with more phases of his trade.
Put more stress on present day problems and less on the past.

Stress more independent job work to teach pupil job-planning, pride in work, and care of equipment.

Put more stress on the mathematics involved in trade training.

The above suggestions, together with those mentioned earlier in this section, should offer considerable aid in strengthening this program in Terre Haute.
Summary of Suggestions Made for Improving Vocational Education in Terre Haute

This part of the study includes a summary of the suggestions made for improving vocational education in the separate vocations studied. The studies have been grouped under manufacturing, building trades, printing trades, and railroad occupations. Information relative to working hours and wages paid has been secured for all occupations in this study, but these data have been filed for the use of teachers and those interested in guidance activities and have not been included in this report.
V. MANUFACTURING

A. Automobile Mechanics

Terre Haute, like all communities, has its share of men employed as automobile mechanics. The local employers report a total employed group at present of one hundred twenty men while in more nearly normal times they employ one hundred fifty men. In general, this industry keeps its employees more steadily employed from March 1 to December 1, although some employers report that their business "runs about the same the year round". There is no labor organization for these employees, however, boys are taken on from sixteen to twenty when employers desire to help break them in as future mechanics. Approximately one boy is employed to four or five experienced men.

Many of the boys taken into the garages of Terre Haute are boys who have had some training in this work at Gerstmeyer Technical High School while others are also employed who apply because of an interest in this work. Employers prefer boys who have had some high school training to boys who have not continued as long in school but they do not insist upon such requirements.
No definite training period exists for beginners in this field. Employers state here that the time required to learn this work satisfactorily usually "depends upon the boy".

**Necessary Training.** The training needed by employees in automobile repair work includes instruction on the different types of automobile power plants, engine lubrication, cooling, troubles and remedies, fuel systems, electrical equipment, including ignition, batteries, starting motors, generators, car wiring and lighting, transmissions, clutches, brakes, front axles and steering gears, frames, springs, and accessories, tire repair, driving rules and traffic laws, shop mathematics and plan reading. Some training in welding, either electric or acetylene, is helpful to most automobile mechanics today.

**Deficiencies.** Employers indicate that the common deficiencies of boys entering this work, and too often mechanics, is a general lack of desire to apply themselves during work hours and a general careless attitude. The greatest objection to the present methods employed by those agencies which teach boys enough work to develop a desire to enter employment is that there does not seem to be any means of attracting boys
of the type needed to make any considerable success in the work. This would imply that the situation needs more study to learn wherein corrections are needed in selection of prospective employees and where changes are needed in conditions of employment in this field.

Those interviewed agree that the best help to be given prospective employees should include an understanding of the different parts of the various makes of cars and the best methods of caring for each, together with instruction regarding the importance of following instructions closely and paying close attention to the work at hand. Replies also indicate that employers are in favor of putting on a training program for boys and men who want to enter this work, either in a day school or in an evening class depending upon the needs of those desiring to take the training.

A ready response and willingness to work with the school authorities in improving training conditions and in setting up a trade committee to guide the training of prospective employees is evidenced in the interviews held. A willingness to employ trained boys and men was also expressed which makes it possible for the schools to develop a strong placement program in this field.
The findings in the bakers' trade in Terre Haute point rather to a need for a strong guidance program in schools than for a definite training course as a part of the regular day training work. Due to the introduction of machines in the baking industry, the work of the baker has been divided into small units and the employees are therefore employed as dividers, oven men, mixers, bench hands and foremen.

There are seventy journeymen bakers and ten apprentice bakers in Terre Haute who represent approximately ninety per cent of all those employed in the community. The busy season in this industry is during the summer months, and especially during the months of April and September.

The bakeries in Terre Haute include: one large plant which manufactures crackers, cakes and bread, all of which are machine produced, and which employs operators for the machines besides two chemical engineers to study and develop recipes for the company's products; three large bread-baking companies, which also use machine production primarily in their manufacturing processes; and fourteen small
retail bakeries which hire one or two bakers each and do most of their work by hand. The latter make bread and pastry goods and retail them in their shops.

Apprentices are taken in this work at sixteen years of age and the industry prefers those with a high school education to those who quit school at an earlier period. Boys are recruited for this work from present employees' families and from friends of these people and are given three years' training in the various phases of the work. One apprentice is allowed per five journeymen or per shift and this assures him rather adequate training during his apprenticeship. During his last year of training, the apprentice is permitted to work on the various machines used in this work not more than two hours per day. This training is given the apprentice to enable him to be a good all around workman when he completes his training.

**Necessary Training.** The apprentice baker needs training in the preparation of ingredients, mixing of straight doughs and sponges, the use and care of machines, firing ovens with coke, gas and electricity and regulating them, figuring costs and
shop schedules, detection, elimination and prevention of bread diseases, compilation and interpretation of records used in the shop, proper formulas for various baked goods, sanitary laws and personal hygiene, and some training in the chemistry and bacteriology of the trade. The greatest weakness of apprentices in this field is due to their carelessness on the job.

Those interviewed in this study agree that any of this training could be given apprentices in school provided the necessary equipment was available. They likewise agree that a trade committee appointed to study the possibilities of putting in such training for apprentices would be a desirable thing for Terre Haute and, where any appreciable amount of training was needed, they agreed to work with the school authorities to improve opportunities for training apprentices in this field and to use boys properly trained through this means.
C. Coal Mining

One of the leading industries of this community has been that of coal mining and to date this industry still employs seven hundred sixty-five men, all of whom are organized. The recent changes that have come about in this industry make it rather difficult to determine the best course to pursue in aiding men employed in mining, and in advising boys who are interested in studying the possibilities of future employment in this industry. Perhaps one fair attitude might be taken, at the present time, and that would be to sound a word of caution to young men and boys as to the need for carefully studying developments in this industry in order that they may be better qualified to know how long to plan to stay with the work and to know where they might find profitable employment in the work.

The busy season for these employees is from September 1 until April 1. Boys are taken into this work after sixteen years of age and required to spend two years at the face before they are considered fully trained miners. State agreements dictate the
proportion of apprentices which is a one to five ratio.

**Training Required.** The technical training needed by men in this field includes training in the proper setting of timbers, the amount of powder needed and the proper methods of placing charges for shooting coal walls, handling of electric digging machines, the different kinds of gases found in mines and how to deal with them, proper methods of mine ventilation, how to administer first aid, blue print reading and chemistry related to the trade, and the State laws regarding coal mining.

**Weaknesses.** The most common weakness of beginners who take up this work is the lack of physical endurance for the work. Classes could materially help prospective coal miners if first aid, blue print reading, safety education, mine gases and State laws on mining were the items taught. Evening classes are preferred by those interviewed as most helpful for beginners in this work.

Employers and employees agree that this additional training is needed and are willing to work with the school authorities in attempting to put on such training whenever possible. They also favor the
formation of a trade committee to guide the training program for coal miners and, when they have sufficient control of the situation, they favor looking to the training agency for additional help when it is needed.
D. Core Makers

There are twenty to thirty core makers employed in Terre Haute with no employers recognizing any union affiliations of their men. The work carried on in this field varies with general business conditions rather than with the seasons, with the exception of one manufacturer of heating boilers who reports his busy season is from June to December. The proportion of beginners to skilled workmen in this field varies considerably in Terre Haute, from one beginner to two trained coremakers to three beginners to one trained coremaker. In the latter case the industry has no product of its own but manufactures items according to customers desires only.

Beginners are not employed as coremakers under eighteen years of age and one employer reports that they take no one under twenty-one years of age. The latter case is due to a previous unpleasant experience with a minor who became injured while employed. The employers report that they select boys for coremakers from laborers hired who show any willingness to learn the trade.
**Necessary Training.** The training needed by coremakers includes: the preparation and mixing of sand, packing of core boxes, removing cores, oven regulation, core baking, rodding and venting of cores, a fair understanding of molding, mechanical drawing, and some knowledge of metallurgy. Those interviewed prefer offering training for journey-men in evening classes where metallurgy, chemistry and the mechanical drawing relating to the trade might be taught. They also favor teaching these items of the coremakers trade in the regular day trade school to boys interested in core making, foundry practice and machine shop work.

In general the employers favor calling on the school authorities for boys who have had some training in this field when they are in need of additional employees. They are also in favor of forming a trade committee to help guide this work and keep it up to date from year to year and to give any other responsibilities to this committee that conditions warrant from time to time.
E. Furniture and Cabinet Makers

In the manufacturing industries in Terre Haute there are included thirty-two furniture and cabinet makers employed. Their busy seasons depend upon general business conditions. Boys are employed in this work at eighteen years of age in order that the employer need take no chances with the liability which arises in case of accident to boys under that age. The training period is of no standard length of time but is based upon individual needs. Boys who enter this work come from the homes of laboring people and they represent boys who must find a way to maintain their own economic existence at an early period in life.

Required Training. The technical training needed by workmen in these fields is very limited since these men are often called upon to operate only a few machines, or to perform a limited number of operations. However, they will be aided if given some training in mathematics, free-hand and mechanical drawing. The use of hand tools and the care, adjustment, and operation of woodworking machines and woodworking machine tools constitute the manipulative
skills required in this work. Some information pertaining to the methods of determining costs of producing various finished pieces will aid these men in appreciating the problems of cost involved in such work.

**Weaknesses.** The weaknesses of workmen and apprentices in this field include a lack of knowledge of mathematics, lack of ability to read blue prints and to interpret them, and lack of appreciation of the items included in the cost of producing finished products in the industry.

Apprentices can usually learn the principal manipulative operations most effectively on the job but they find little opportunity to learn the mathematics and blue print reading needed without special training. Those interviewed prefer establishing evening classes during the winter months provided the training program can be properly supervised by a trade committee.

Since the workmen in this field are little organized locally, the employees agree with the employers that, provided only interested boys are selected for training and the proper person is selected as instructor, a day-trade training program
should be helpful. Those engaged in this industry are willing to work with the school authorities and call upon them whenever more employees are needed. Employers favor permitting instructors to visit their plants to keep in close touch with the work of the trade. Employees and employers likewise agree that a trade committee, to guide the training program offered boys and men, should be a very useful body and those interviewed agreed to work with the school authorities whenever possible as an aid in setting up a strong trade training program.
F. Machinists

The manufacturing firms in Terre Haute employ from seventy-five to one hundred thirty machinists depending upon general business conditions. Several of these men are employed as maintenance and general repair men hence their employment is more steady than those employed in metal products manufacturing. Those employed as machinists in the railroad industries have been referred to in connection with the comments on the railroad industries and they have not been included in this enumeration.

Boys are not employed in this work under eighteen years of age but no upper limit is given as to the age when men enter this work since these men are not organized over fifty per cent. The need for machine operators has much to do with this situation in Terre Haute. Some employers claim that the present methods of training men for work in this field are not producing sufficiently well-trained workmen but their reports also show that they have little sympathy for the work of any training agency for such workmen, but merely hope to employ only trained workmen. Other employers have found the trade training that is being offered for prospective machinist apprentices "very good as far
as schools are concerned. This situation points to a need for greater effort to be spent to develop a better spirit of co-operative study of the training problem in this field. Little probably will be realized in this matter until general business conditions improve or until several conferences can be held with employers who see little need for being concerned with training possibilities along this line.

Boys are attracted in this work, much as they are in other vocations in Terre Haute, namely, by applying for work when they need employment or by having become dissatisfied with school work. When they find an opening they take it because it offers them employment. This shows another need for further study if boys are to be placed successfully in such employment and if employers are to become more interested in trade training. The length of training period recommended by employers varies with the experience the boy has had before seeking employment. This situation suggests a need for improving and strengthening the training program in the city schools by asking the school authorities to explain more clearly the ways in which trade training might be set up locally for the good of all concerned in this voca-
Necessary Training. The training needed by workmen in this field includes a study of speeds at which various metals can be worked, uses of high and low carbon steel, uses and methods of working alloy steels, mechanical drawing and shop mathematics pertaining to the work of the machinist, the proper use and care of precision instruments, machines and other tools, shop cleanliness, and fitting tolerances for various kinds of work.

Failure of Apprentices. The greatest cause of failure of apprentices in this field, according to local employers, is that they become specialists in one line of work which might pay more than some other type jobs and therefore they do not become well trained in all phases of the machinists' work.

Those interviewed agree that evening school classes for those employed in machine shop work could be most helpful to this industry if such employees were taught shop mathematics, blue-print reading, and mechanical drawing, along with modern methods of performing the work of the machinist. They also agree that similar training in the day trade classes should be most helpful to boys interested in this work.
As a means of improving the quality of the work of machinists, many employers favor the formation of a trade committee to guide the training program and the selection of prospective apprentices. They also favor calling upon the schools for boys and men who have the training when they are in need of further employees. Most of those interviewed also favor referring problem cases, where boys have difficulty in getting adjusted to employment, back to the school authorities for whatever assistance they might render.
G. Molders

The various manufacturers operating foundries employ from one hundred to two hundred molders depending upon general business conditions including approximately forty beginners. Their busy season generally runs from June to December although some report no definite seasons per year. The union organization for molders attracts only a very small percentage, some estimated at one per cent of the molders in the community, and these men remain interested because of the insurance feature attached to their extended period of membership in the local union. Most manufacturers operate open shops and deal with their men individually in Terre Haute.

A few of the employers favor using boys only partially trained but they usually use these boys as machine molders. The other employers use only experienced molders for they have found little difficulty in the past few years in securing all the men they needed without taking on boys. When work is plentiful most of the employers call on their foremen to train apprentices for a four year period, but this practice has not been carried on recently. Whenever boys have been hired employers desire boys
who are large enough to endure the work and who are eighteen years of age or older.

**Necessary Training.** The training needed by the all-round molder includes instruction in the proper methods of using and caring for machines, molding sands, patterns and follow boards, proper methods of handling flasks, setting cores, venting molds, ramming molds and using chaplets, some knowledge of metallurgy and the chemistry of the trade including the mixture of metals, and the shop mathematics related to their daily employment.

**Causes of Failure.** The most common cause of failure of apprentices, and some journeymen, in this field, is the lack of sufficient general education and in their inability to analyze new situations and that they do not learn proper methods of gating and allowance for strain on cope in ramming up molds.

Employers are agreed that much of the training needed by molders can be secured in school provided proper equipment is available, but they prefer evening school classes for boys or men who need further training to equip them for better service in the trade. Most employers are in favor of calling upon the school authorities for boys when they are in need
of more beginning employees and they likewise favor establishing a trade committee to guide this training program and aid in selecting boys to be trained for employment in Terre Haute. Most employers favor referring problem cases, where boys have trouble in getting adjusted to industrial employment, to the school authorities for whatever aid may thereby be given such boys. This situation points out some training possibilities and likewise the handicaps facing those who might be interested in attracting boys to this vocation.
H. Patternmaking

In the manufacturing industries of Terre Haute, employers report that they employ from thirty-five to forty patternmakers without recognizing the union. There no seasons which affect the employment of these men excepting general business conditions, such as those existing at the present. Boys are taken into this work as apprentices at the age of eighteen years and serve four years of apprenticeship. At present only part of the employers take on any apprentices, the others employ only experienced patternmakers but this is a situation that is largely associated with the general business conditions. Most of the employers have employed boys who have had partial training for the trade in the local trade training program at Gerstmeyer Technical High School.

Required Training. The training needed by patternmakers includes the following: blue-print reading, a fair knowledge of molding, an understanding of the shrinkage of metals, a knowledge of machine shop practices, and the construction of the whole project so proper allowances can be made for fit, play, etc., proper methods of preparing and using glue,
purpose of and allowance for draft in patterns, ability to approximate time required to construct pattern, a fair knowledge of core making, a knowledge of the standard colors to be used on different parts of patterns to denote core-prints, loose pieces, stop offs, etc.

Causes of Failure. The most common cause of failure of patternmaker apprentices and journeymen is that they do not have a sufficient understanding of the work of the core maker, the molder, nor the machinist to construct patterns in such a way that they may be used in production with the least possible cost.

Employers favor the establishing of evening classes for apprentices and occasionally journeymen, to help them in any correspondence study they may be taking and to teach them whatever manipulative operations the school may be equipped to handle as well as courses in shop mathematics applied to this work. They likewise are in favor of calling on the school authorities for aid in securing prospective employees who have had some training, and they are in favor of establishing a trade committee to guide this training program and thus help the
school authorities keep this work up-to-date as much as possible. Some of the employers are in a position to use boys who have had some training in patternmaking as part-time employees, especially during rush seasons, after school, and on Saturdays and they are interested in taking on such boys as one means of securing more capable future full-time employees.
I. Power Sewing Machine Operators

One of the important manufacturing industries of Terre Haute employs workers, mostly women, as power sewing machine operators who are engaged in making working clothes for men and coats for women. This industry employs from three hundred fifty to four hundred fifty women. The busy season runs from March 1 until December 1. The workers are not organized, however, employers hire approximately one beginner to five experienced operators in order that needed training may be properly cared for. Beginners are employed from eighteen to forty years of age and then given various types of material to work upon depending upon the speed required to get out sufficient production per employee. The younger employees are usually put on work that requires fast manipulations while older workers are used on more exact work which does not require such great speed.

Girls are attracted to this work who hear about it from relatives or friends, others are attracted because they are seeking employment and take the first thing they find. Employers prefer employing girls who have had a high school education but they do not insist upon such qualifications.
The method of training beginners in this work is not considered successful by local employers for, they consider, it takes the girls too long to learn the work, although the reports show that this period runs for about eight or ten weeks. The training required of such employees includes information regarding the proper care of the machine, together with that help required to gain sufficient confidence to operate a fast and somewhat noisy machine. Another handicap facing this industry is in the shortage of forewomen. Employers are interested in any attempts that might be made to study means of providing the training needed by operators and means of developing more interest in foremanship on the part of these employees. The greatest objection that present employees have to the work of the forewoman is that they do not care to take on the added responsibility of the position. This situation needs more study before any recommendations could be made regarding methods that might be used to correct such conditions.

**Weaknesses of Employees.** The most common weaknesses of employees, and beginners, in this work includes the fact that their previous training, on the
operation of sewing machines, does not instill in
learners the need for rapid work that the textile
industries desire in their workers. Another weak-
ness mentioned by those interviewed, stated that
they did not attract girls with personalities most
helpful to their progress as operators nor fore-
women in this industry. This weakness may result
from improper training methods and industrial prac-
tices within the industry or it may be the result
of insufficient guidance in our public school sys-
tem.

Employers agree that the schools could im-
prove the workers in this field by teaching more
of the problems facing employees in industry while
girls are in school and by helping to instill in
these girls a willingness to assume responsibility
by the time they enter employment. Employers also
agree that the fundamental principles of sewing ma-
chine operation can well be taught in the public
school providing sufficient time is devoted to the
speed element as well as accuracy.

The responses received from employers in this
industry show that they favor working with the
school authorities in strengthening training for em-

ployees who expect to become, and are engaged, in the local textile industry. They are willing to call on the school for prospective employees and to work with the school authorities in developing a strong training program for girls interested in such work. Employers are also interested in the formation of a trade committee to guide this work and to keep it up-to-date from year to year.
Since Terre Haute has been a center for coal mining, several industries have developed in the community which make mining equipment. These manufacturers employ men as sheet steel punch press operators and as scale assemblers. The need for training workmen in these fields, together with the reactions of those interviewed regarding the opportunities for such training include the following:

The sheet steel machine operators and assemblers include thirty-two men and two apprentices while there are thirty-five scale assemblers employed at the present time. These men are employed during the major part of the year except during very dull years. Boys are taken in these lines of work who have had some high school training.

Since there is no organization for workmen in these fields, the period of training that any employee must experience depends largely upon his personal ability and interest in the work. The training needed by workmen in these fields includes the
Training Needed. For sheet steel punch press operators and assemblers training is needed in an understanding of the properties of the materials worked upon, together with a knowledge of the various types of machines, the operations for which each is best suited, and a knowledge of the use and construction of templates, jigs and fixtures.

For scale assemblers training is needed in the proper use of tools and in accuracy in the performance of all phases of this work. Some knowledge of the characteristics of materials used in scales is also helpful to these employees.

The Difficulties Encountered. The greatest difficulty boys have in this work is that much of it is rather hot work and much of it is heavy work as well, hence they do not like to stay with the work. The amount of training that might be beneficial in these fields is likewise rather limited in extent. The employers state that the training most helpful for these workmen would include the practical training in the properties of metals, and present day methods of working them.

Employers are in favor of working with the
school authorities whenever it is possible to secure needed employees and when they can offer assistance to instructors regarding methods used in their industries in fabricating materials. They favor the formation of a committee to aid in setting up educational content related to such work and to help the school authorities in their student placement program.
L. Welders

The need for training in this field is reported under the railroad occupations. Total reports show that there are thirty-five men employed in commercial shops and that these workers are not organized.

The work of these men is closely allied to all manufacturing, hence their busy season varies with the industries. There is no final agreement to date regarding this group of industrial employees who should do this work. Some employers give this work to blacksmiths, others to machinists, while others train men to do this work only.
VI. THE BUILDING TRADES

A. Bricklayers

In summarizing the training possibilities for bricklayers in Terre Haute, the replies from employers and employees show that there are approximately one hundred to one hundred thirty-five bricklayers in this community. These men are employed most regularly from April 1 to December 1 and they are about ninety per cent organized locally. Boys are taken into this occupation between the ages of sixteen and twenty and they come usually from homes of bricklayers but occasionally other boys are taken on as beginners who have the physical endurance and interest to learn the trade.

Training Required. The apprentice must serve an apprenticeship of four years during which time he is asked and expected to learn the different methods of bonding, the construction of arches, gables, cornices, and ornamental work. He needs to learn how to read blue-prints and interpret specifications, building construction methods, and regulations. There is comparatively little chance to learn the better grades of work on the job.
Workmen may be aided materially if given an opportunity to learn more of blue print reading and the interpretation of specifications in a class set up for such study, hence the employers and employees favor organizing such a class during the winter evenings. Employers and employees alike are willing to co-operate with the schools in putting on such training and, when this is properly carried out, they are willing to call on the school authorities for aid in securing employees when in need of additional men. The exact number of men needed, as well as apprentices varies so greatly from year to year that these men prefer to work with the school authorities in putting on training programs for those needing further training, providing the school people agree to accept trainees as recommended by those engaged in the vocation.

The formation of a trade committee to guide the training to be offered bricklayers, or prospective bricklayers, is favored by those interested in this field as employers and employees and both of these groups favor doing everything they can to make any training program, organized for men in this work, as effective as possible.
B. Carpenters' Summary Findings

In summarizing the findings regarding existing practices and possibilities for training in carpentering in Terre Haute the following facts have been secured:

There are one hundred seventy-four members in the local union No. 133. The larger contractors employ union workmen in this field primarily but in the city as a whole the carpenters are organized about eighty per cent which shows that there are approximately two hundred twenty carpenters in this community. The busy season for these men extends from April 1 to December 1 leaving the winter months free for self improvement for those who need further training who desire to secure a better appreciation of the total work of the carpenter or carpenter contractor.

Apprentices are taken into the union between seventeen and twenty-two years of age, hence the workers prefer training programs in the day school which would aid boys interested in carpentering in finishing their training at seventeen years of age or older. This situation would aid the day trade school for it would help the school authorities in
holding such boys in school until they graduated from high school as well as to complete the formal training in carpentering offered at Gerstmeyer. The union officials favor this latter or more prolonged training program for they feel it would help attract more desirable boys for work as carpenters which they admit is a present need.

Causes for Failure. The workers feel that the greatest cause for failure of apprentices at present is the lack of continuous employment while the employers claim that the habits that such boys develop toward work and their general home conditions are rather detrimental to their proper development as capable mechanics. This situation shows a need for more real understanding between employers and employees of each others problems and might be a fertile field for the school authorities to help work out.

Necessary Training. Employees and employers agree that the training of boys who desire to become carpenters should include the theory relating to the work of the following: carpenters and joiners, railroad carpenters, bench-hands, stair builders, millwrights, furniture workers, reed and rattan workers,
floor laying, cabinet makers, box makers, and car
building. It also should include training in mill-
ing, fashioning, joining, assembling, erecting,
fastening or dismantling all material of wood, hol-
low metal or fiber, or of products composed in part
of wood, hollow metal or fiber, the laying of all
cork and compo, all asphalt shingles, the erecting
and dismantling of machinery and the manufacturing
of all wood materials where the skill, knowledge and
training of the carpenter are required either through
the operation of machine or hand tools.

Required Training. Regarding the type of
training most helpful for those engaged in the work
of the carpenter, employers and employees agree that
evening class instruction in blue-print reading and
estimating are the most needed forms of training for
these men, and both groups favor establishing such
classes during the winter months. The larger con-
tractors are interested in seeing a training pro-
gram established which will aid carpenters in de-
signing and building concrete forms suitable for
various jobs. In addition, all are agreed that work-
men need to have a better appreciation of costs of
construction work. Employers favor those workmen
who take up correspondence study after they are twenty-five years of age for in most cases these men become better workers thereby. These employers favor establishing evening classes for tradesmen to help them in getting more aid from study and to speed up the time when they will become more efficient workmen. Both employers and employees agree to co-operate with the school authorities in making such a program as successful as possible when such classes can be organized.

In order that the training program for boys and men interested in carpentering may be as successful as possible in Terre Haute, employees and employers alike favor calling on the school when in need of boys or better trained men that have been enrolled with the school, and they likewise favor the formation of a trade committee to guide this training program and keep it functioning as effectively as possible as long as it is in session.
C. Electricians

The number of electricians employed in Terre Haute varies from thirty to forty-five according to the employers' reports and these reports show that the electricians are forty per cent organized locally. The busy season for these men, employed as inside wiremen, extends from April 1 to November 1 while those employed as maintenance men in factories are employed the year around. The motor repairmen are likewise employed continuously.

Boys are permitted to enter this work at sixteen years of age and are eligible for apprenticeship until they are twenty-one years of age. Apprentices serve a period of four years before they become journeymen electricians and several boys who are now apprenticed to the trade have had some preliminary training in house wiring at Gerstmeyer Technical High School. Employers are not highly satisfied with the type of apprentices they are able to secure at present for they have difficulty in securing boys "who will do what they are told", and "who have enough energy" to make of them profitable employees.

Boys are secured or enter apprenticeship in this
trade because their fathers are engaged in the same work and others secure employment in this line of work because it is necessary for them to go to work and they take the first thing they find. This situation points to a need for more adequate try-out programs in industrial education in the public school and for more effective guidance work while these boys are in school if they are to enter this work more advantageously.

**Necessary Training.** The training needed by electricians includes the following: instruction in the handling and splicing of insulated wires, installation of conduits, making of electrical connections, fixture wiring, installation of electrical apparatus and testing circuits, knowledge of electrical currents, theory of electricity with emphasis on definitions of terms and electrical measurements, ability to read wiring diagrams, and repairing of motors. Some employers state that prospective apprentices need only an elementary school education while others prefer boys who have had high school training. They all feel that little trade training
can be given boys in school unless the teacher is well trained in the trade.

**Causes of Failure.** The most common causes for failure of apprentices in this field include a "lack of energy" and that after a short training program they "think they are journeymen electricians." This again points to a need for better guidance of boys taking this work while in school.

Employers feel that trade training classes should treat primarily of the theory relating to electrical work and a study of appliances used in this work and they feel that this work would be of assistance to both apprentices and many journeymen electricians. They favor evening classes for employed workers.

Those interviewed are not in agreement about the value of calling on the school authorities for aid in securing employees nor on the advisability of establishing a trade committee to guide a training program in this field since some of the employers have not had the best success with boys they have had from trade classes heretofore. Such statements show a need for improving conditions in school
if much advancement is to be made in co-operative, or other forms of training for apprentices for journey-men in the field.
D. Painters

The building trades in Terre Haute include one hundred to two hundred painters who are employed most regularly from April 1 to December 1. The painters are about forty per cent organized locally.

Boys between the ages of eighteen and twenty, are accepted and required to serve a four-year period of apprenticeship. The source of supply of apprentices comes from the families of painters as well as boys who are interested in learning the trade and are found to have the ability to profit by such instruction as is needed in the occupation.

Training Needed. Apprentices in this field need training in the mathematics involved in estimating jobs, color harmony and a knowledge of the primary colors, use and care of scaffolding and rigging, proper mixing of colors, and matters pertaining to the hygiene of the trade. All of the skill required in this work can be learned effectively on the job but little of the technical matter can be learned there to advantage.

Causes of Failure. The weaknesses of apprentices and journeymen in this field include a deficiency in
their understanding of primary colors and color combinations, lack of ability to match colors, lack of knowledge of designing and color harmony. These employees weaknesses indicate phases of the work that could be advantageously made a part of a training program for workmen in this field. Those engaged in this work prefer that attempts to further the training of apprentices, and other painters, be put on as an evening class program through the winter months provided a suitable instructor is secured to handle the instruction.

When they have a voice in the problems pertaining to the training of painters, those engaged in this field of work are interested in working with the school authorities in fostering such a program locally. They favor the formation of a trade committee to guide this type of training and are willing to aid in any way possible to make such training as profitable as possible.
E. Plasterers

In the field of plastering in Terre Haute, the union officials report a present membership of fifty members with four apprentices. Since this number is approximately eighty per cent of the total number of plasterers in the city, as estimated by the employers, the total number of plasterers in the city is approximately sixty-three journeymen and five apprentices. These men are employed most regularly from March 1 to November 1 with a dull season during the winter months.

The entrance age limits for apprentice plasterers is sixteen to twenty-one years. Boys who take up this work are frequently boys whose fathers are also plasterers. The period of apprenticeship lasts for four years during which time the organized workers hope that these boys will learn the blueprint reading needed by workmen as well as learn the use of the materials and tools of the trade and the methods used in laying out ornamental work from blueprints. Both employers and employees are agreed that this information and some of the experience can well be gained in the day or evening schools when
proper arrangements are made with those engaged in the industry and those responsible for the training program. Workmen now engaged in plastering can be helped most through an evening school program carried on during the winter months in which blue-print reading is taught plasterers together with estimating costs and figuring materials needed per job.

Causes of Failure. The greatest cause of failure on the part of apprentices is due to the fact that the work is often too hard for boys, according to the union officials' report. The employers feel that failure of apprentices is largely due to habits of indolence and the lack of helpful encouragement from parents. The recent industrial depression no doubt has considerable bearing on this situation and explains some of the attitudes taken on this item by both the employers and employees. The extent of the effect of such a situation is hard to determine, hence the writer merely attempted to secure present reactions of employers and employees on certain matters pertaining to training needs and possibilities as those parties see them at the present.

Employees and employers are both interested in arranging a program that will function well enough to
make it possible for boys and men to be called for employment from the school. These parties are also in favor of permitting the instructor of such work to visit workmen on the job any time so he may keep well informed on current practices in the trade and to enable such a person to help boys get started in regular employment more advantageously. Likewise they favor the formation of a trade committee to guide this program whenever training in this field is added to the work offered in the public school day or evening program. The employers favor a general building trades committee to guide this work rather than a committee per trade while the employees favor whatever committee will care for this matter in the most efficient manner.

From replies received it is indicated that evening classes in ornamental work would be profitable for those now engaged in the plastering trade since their previous training included only plain work.
F. Plumbers

The plumbing trade employs from twenty-five to sixty journeymen and apprentices in Terre Haute except during the dull season which comes from February 1 to May 1. The workers in this field are all organized and about fifty per cent of the work done in the community is done by union plumbers. The remainder of the work is done by former journeymen plumbers who have gone into business for themselves and who do their own work entirely. The common understanding in this trade is that such master plumbers will give one-half of all their work, that exceeds $800.00 per year, to local journeymen but this proves to be a difficult rule to enforce.

This industry employs one apprentice per five journeymen and takes on boys who are eighteen years of age or older. Each prospective apprentice must work for one year at the trade and then if he makes the proper showing and gives evidence of being interested and fairly capable in the work, he is signed up as a regular apprentice. Four more years must be served before the boy becomes a journeyman plumber.

Required Training. The training needed by ap-
prentice plumbers, and others who are not properly qualified to carry on the work, includes training in mechanical and architectural drawing as an aid in taking off materials from building plans, methods of installing gas, water and drainage systems in accordance with legal provisions and with the requirement of modern plumbing hygiene, enough general education to enable them to meet customers advantageously.

The source of supply for apprentices in this field at present is not organized in any sense. Boys merely apply for work and if, after serving as prospective apprentices for one year, they like the work and seem to be good prospects they are retained as apprentices. This phase of the apprentice problem could be materially improved by better cooperation with the school authorities and the trade, as admitted by all those interviewed. This practice also partly explains why many apprentices do not succeed in the work. Those interviewed stated that many soon fail at it because of their dislike of the numerous complaints of the public about the plumber.

When the schools have sufficient equipment for
teaching plumbing, all agree that boys could learn much of this work to advantage in school. And it was likewise agreed that evening classes for workmen in this field, especially apprentices, could serve a real need in bringing these men together for the discussion of improved trade practices and methods to be used in meeting the customer. Since it is common practice for about eighty-seven per cent of those who go into business for themselves in this field to fail, it is agreed that any training program put on for this group of men should teach them how to figure the expenses involved in doing any job.

This industry has a Joint Board of Arbitration established, consisting of three journeymen and three master plumbers, who expressed a ready willingness to co-operate with the school authorities in studying the training possibilities in this field and to aid in keeping this work going effectively whenever any work can be organized. They are very greatly interested in seeing to it that more of the men engaged in the industry gain more education than has been the custom heretofore, since they feel that this is the best means for the industry to gain a more respect-
able standing in any community as well as making it possible to attract a better type apprentice to the trade.
Employers in the sheet metal industry use from thirty to sixty journeymen and apprentices while the union officials report a present membership of twenty. The busy season for sheet metal workers extends from April 1 to December 1, however, all agree that the best time for classes for apprentices and journeymen is during the evenings in the winter.

This industry admits boys over eighteen years of age who generally become apprentices because it becomes necessary for them to go to work or because they become dissatisfied with school work but employers have no record of their school training. Such boys secure employment as apprentices in this field most often through their fathers. Apprenticeship covers a period of three years during which time the boy is supposed to learn his trade. This is followed by a fourth year when he serves as a junior journeyman before he is entitled to full journeyman standing in his trade.

**Necessary Training.** The training needed by sheet metal workers includes the uses to which tin
and sheet metal are put, and the composition, weights and qualities of the sheets, pattern drafting, cutting, forming and assembling of finished products, and the mathematics involved in pattern layout and figuring costs per job. Since most of the sheet metal work used on buildings, such as gutters, and is shaped in the plants in which it is originally made, pattern drafting now refers primarily to special jobs, and thus calls for considerable understanding of the principles involved in this phase of the work.

Causes of Failure. Those interviewed regarding the weaknesses of apprentices today report this to refer primarily to the boy's lack of desire to do any overtime work or to study evenings to gain a better appreciation of drafting and other theoretical phases of the work that lead to efficiency on the part of the workman. Others report that boys expect too much money from the start and that this often prevents them from learning the trade properly. These statements point to a need for more adequate guidance in our public school program as well as more effective leadership in parent-teacher meetings to give adults a better appreciation of the
common problems facing young people when they seek employment.

It is also agreed that the day or evening classes could teach most of the work required in pattern drafting, cutting, forming and assembling projects in sheet metal work if proper equipment is available. Those interviewed expressed their belief that a trade committee would aid materially in keeping this training program functioning in the best manner and the employers agree to call on the school for aid in securing employees when they are in need of such help and when the school has boys available in this field.
H. Structural Iron Workers

The building trade includes some twelve or fifteen structural iron workers in Terre Haute all of whom are organized. The busy season for these men corresponds to the other building trades, namely, from April 1 to December 1. Boys are taken into this work as apprentices between the ages of eighteen and twenty-two to serve an apprenticeship of four years before they become journeymen workers. They are generally drawn from families of iron workers and from boys who are strong physically and who desire the life of the person who needs to travel considerably to keep employed.

Required Training. The technical training needed by those engaged in this field includes, a working knowledge of arithmetic, strength of materials, riveted joints, mechanics, free-hand drawing and design as it applies to laying out structural iron work. They should be able to follow blue-prints and specifications, lay off and measure accurately for rivet holes and half-lap joints on straight and curved work, and to lay off forms for irregular work. They should have a working knowledge of the physical and chemical
properties of steel and iron.

Weaknesses of Apprentices. The most common weakness of workmen and apprentices in this field is that they soon develop undesirable personal characteristics which tend to limit their abilities as workmen. This is due to the fact that this work frequently requires the men to move about over the country considerably in order that they may keep employed. Such experiences, if continued long, seem to develop personal traits somewhat detrimental to continued success as a workman.

Apprentices can learn the manipulative phases of this work most successfully on the job but they have considerable difficulty in learning the technical aspects of the work unless given an opportunity to secure some instruction off of the job. Employers and employees agree that it would be desirable to offer this opportunity for training in winter evening school classes. The work carried on in these classes might be organized by some capable teacher, employed locally, or this training might be of such a nature that it would aid workmen in completing correspondence study much more successfully.

When a training program is offered, under the
auspices of the school authorities, which meets the needs of men engaged as structural iron workers, those interviewed agree to call on the school authorities when in need of additional employees who have been carrying on study and to aid those interested in such teaching in any way possible.
VII. PRINTING OCCUPATIONS

In the printing field, union men only are employed by the newspapers while the job shops are largely open shops. Replies show that there are one hundred sixteen journeymen and twelve non-union printers together with sixteen union apprentices and six non-union apprentices. This enumeration includes pressmen, press feeders, compositors, linotype operators and estimators only since the other employees found in print shops such as paper cutters, salesmen, shipping clerks and truck drivers required training that was considerably limited in extent or somewhat varied from that needed by those most highly skilled in the specific work of getting out printed materials. In union shops one apprentice is employed per seven journeymen but no shop in Terre Haute has over three apprentices.

The dull season in this field comes during the summer months or approximately from May 1 to August 1 which makes those engaged in this work somewhat interested in the possibilities of further
training in short unit day courses during this summer season. Others are agreed that an evening school program, through the winter months, might be of material assistance to men now engaged in this trade. With the recent merger of the two leading newspapers, there is little enthusiasm among the union printers for pushing the day vocational program at present for, as the union officials state, there are some twenty-one journeymen printers that are now averaging two working days per week and many of the boys who have entered this work recently have given it up for more promising fields of employment.

Employees and employers are both agreed that apprentices should be given most thorough training in reading, spelling, punctuation, proper spacing and neatness in their work, and that they should be taught to be quick in making their decisions as to the proper type to be used on a given display advertisement job.

**Weaknesses of Apprentices.** The weaknesses of apprentices include the fact that they are not thorough enough, that they need more thorough training in such fundamentals as locking-up type, justification, registering-in and setting-up book forms in their prop-
er arrangement for printing. A study of the history of printing is favored also.

Employers are considerably interested in the possibility of establishing a dull season day training program for lay-out ad designing including color designing. They realize that this training requires a highly skilled teacher but are in favor of attempting to put on such a course in the summer when a skilled man might be brought into Terre Haute to offer a short unit day course for men who show some ability in this line of work as well as to open such a course for those teaching boys in the schools of the city.

Considerable effective training in this field has been carried on in Terre Haute for several years, hence employees and employers are in favor of using the school as a means of securing boys and men who are available for work when there are vacancies in the community. They likewise favor the practice of permitting the teachers in this field to interview boys at work and observe the developments in the field from year to year in order that the training program may be kept up-to-date as thoroughly as possible. There is, likewise, a firm belief in the
value of a trade committee in this field to help guide the training program offered in printing in Terre Haute whether it be a day or evening training program.
VII. RAILROAD OCCUPATIONS

A summary of the railroad repair vocations needing any considerable amount of preparatory training in Terre Haute show the following possibilities: the four railroads running through Terre Haute include the Chicago and Eastern Illinois, the Chicago, Milwaukee and St. Paul, two divisions of the Big Four, and two divisions of the Pennsylvania. The present group of employed men who require more or less specific training for their work consists of sixteen boilermakers, fifty-two machinists, six welders and blacksmiths, and eighty-seven car-repairmen. The remaining employees are largely common laborers, hence they have not been included in this report. Included in this list are one apprentice boilermaker, four apprentice machinists, one apprentice welder and eight apprentice car-repairmen. On an average about seventy-five per cent of the workmen in this field are organized.

The summer months, or approximately from May 1 to August 1, are dull months for employees in this industry. However, the reactions of all those
interviewed favored the formation of classes for the improvement of any of these workmen during the winter months, whenever any such attempts are made.

New employees are taken into these fields from eighteen to thirty years of age, when business conditions permit. The most common method of selecting apprentices in this field is to promote helpers. This method is frequently used because it aids the companies in avoiding the weaknesses of many apprentices selected otherwise, namely, developing a lack of interest in the work after a short try-out period.

Training Suggested for Railroad Employees. The training recommended by those engaged in this industry includes the following per occupation:

For boilermakers: training is needed in boiler construction and a knowledge of the strength of materials in boilers, principles of steam engineering, shop mathematics applicable to the work, and ability to lay out work for boiler repairing.

For machinists: training is needed in the strength of materials and the selection, uses and care of proper tools to be used on the different materials found in all parts of the engine excepting the boiler.
Training is also needed in mathematics and blueprint reading to develop higher efficiency in laying out repair work and working to closer limits. The use of more powerful engine equipment by the railroads has brought about a necessity for these men to be rather careful workmen compared with the type of work formerly carried on in such repair departments.

The training needed by welders includes the following: proper methods of electric welding and methods of determining strength of weld needed, and the cutting of metal in car repair work.

Railroad car-repairmen need training in the rules that pertain to proper methods of keeping cars in repair, and, in American Railway Association air brake testing.

It is generally agreed that men in railroad shop work can learn the manipulative work of the various crafts better in the railroad shops. However, those interviewed made the following recommendations as to further training that would be most helpful to these men:

Machinist apprentices need additional assistance in mathematics which would help them in lay-
ing out their repair work and following other specifications. This work would have to be offered in evening classes if it functioned properly for these men.

Welders or blacksmiths need further evening school training in the mathematics pertaining to their work, and in plan or sketch reading.

Car-repairmen could profit most from training, in their free time, whether day or evening, in a study of air brake testing and in a study of American Railway Association car repair rules. This work has been suggested as most helpful for car inspectors and foremen. Apprentice boilermakers could profit from evening school study in mathematics referring to a study of the strength of materials used in boilers and in plan reading.

Many apprentices in these occupations try to secure training through correspondence study courses and it has been suggested, by those interviewed, that if such men could be brought together in an evening school class, the results of such study could be materially improved.

Since all those interviewed favored establishing more effective methods of training apprentices in these
fields, they agreed that this work would be still more effective if a trade committee could be formed to guide the training work in each vocation and they also favored using such an organization as a better means of securing workmen more suited to their needs.

One company which still employs mechanics taken on during the strike in 1922, does not recognize the organized workmen. Therefore, they do not look with favor upon the formation of a trade committee but state it is "unnecessary and a possible cause for serious unrest if a boy knows that he has a 'court of appeal' in the form of a trade committee".
IX. CONCLUSION AND RECOMMENDATIONS FOR INDUSTRIAL ARTS
AND INDUSTRIAL VOCATIONAL WORK

This study was made by the writer during the winter and spring of 1930 - 1931 in connection with a study made by the industrial vocational teacher training department of the Indiana State Teachers College and by the city school authorities with the hope of improving the local industrial vocational educational program and making it conform more closely with suggestions made by the state department officials.

All those who had a part in this study realize that it is not completed. Such studies are valuable in modifying the school program only at the time they are made. When starting a new type of vocational work the decisions must be made on up-to-date information. This study should serve as a means of developing a continuous survey for industrial vocational education in Terre Haute.

The writer has made further suggestions for certain developments that would materially improve the local trade training program.
A. Industrial Arts

The city school industrial arts program needs further study to determine the years in which this work can best be given and still stay within the financial limits of the community. In the past this work has been offered as so many independent courses wherever it has been offered. Such conditions call for more expenditures for equipment than might be needed if the program were offered as a unit for the city as a whole.

Students and state officials are both interested in offering a more extensive try-out or finding program in industrial arts work through the formation of more general shops in the junior high schools of the city. Such a program could relieve Wiley and Garfield High Schools of the necessity of carrying on industrial arts work unless finances permitted the continuance of such work. Gerstmeyer Technical High School could then be used as the school for these students who are interested in a pre-engineering or technical high school course and trade training.
Improving the industrial arts program would also aid boys in making a more intelligent choice of high school training than is now possible.
B. Industrial Vocational Education

A study of the replies of former students of two-year trade training programs at Gerstmeyer High School shows that, in many cases, they would have been helped in securing industrial employment had the schools maintained a more effective placement service.

Employers and tradesmen alike are interested in a trade training program for Terre Haute as long as properly qualified teachers are employed and the courses stress as much technical information as is possible for the students to understand. Since it is not profitable for them to take the risk of employing boys under eighteen years of age, many employers favor extending the training period for boys and girls two more years so these prospective employees will be better qualified to enter industrial employment as greater assets.

These data seem to indicate that evening school programs will aid workmen most effectively and in the majority of cases evening classes during the winter months are preferred. The printers prefer a strong
short unit day course during the summer for lay-out and design study.

The information secured seems to indicate that there is little opportunity to establish much co-operative trade training locally at present. Employers do not favor such a plan due, no doubt, to a lack of experience with such a plan and due to a very limited need for boys. This situation might change naturally when business conditions improve. At any rate, it shows a need for further study on the part of those in charge of industrial education in this community since many industrial concerns in Terre Haute employ only a few men per occupation and they cannot hope to attract well trained workers unless a co-operative attempt is made to foster a training pro-

gram.

Replies seem to indicate that the junior high schools should have a uniform pre-vocational program with a system of records which would make it possible for the authorities of the senior high schools, and particularly Gerstmeyer, to obtain a detailed record of each pupil's training previous to entering the high school. This would enable those in authority to give the student more intelligent assistance in se-
lecting and shaping his course.

These data also indicate and urgent need for a placement department at Gerstmeyer. Accurate records should be kept thereby enabling those in charge to more properly place the boy in industrial life.

However, the most urgent need, as indicated by replies to questionnaires and also by conversations held with both employers and employees, is for an efficient evening school, possibly supplemented by a part-time day program.

Employers favor evening classes in preference to part-time classes for their apprentices. The workers themselves have indicated a desire for evening instruction that will supplement their daily shop experience. Both state that promotion will result from these evening supplementary courses.

It is definitely agreed that cooperation between school and shop is a condition which must be met and satisfied. The outgrowth of this relationship must be an agreement that will clearly define certain conditions surrounding the work of the school, the length of apprenticeship training, credit for work done in school, and rate of pay during such
apprenticeship. At present no written records of individual efficiency of workers are reported as being used in the shop. There are no entrance tests of the worth of the applicants except the actual trial on the job. There is at present little organization of shop practice which might fit in with the proposed plan for trade training classes. It is evident that the basis for all successful vocational teaching, whether in evening school or part-time day school, must rest upon a close cooperation between the school, the employee, and the employer.

Replies recommend that the teachers be practical men to carry out the recommendations of the findings. The findings show clearly that practical teachers are desired. The trade instructors require knowledge of the craft and a general experience which equips them to teach. The teachers of related subjects require knowledge of the crafts and adequate academic training, while the teachers of general or non-vocational subjects require adequate academic training and contact with life.

**Type of Evening Instruction Most Appealing to Boys and Men.** The writer wishes to emphasize particularly the type of evening instruction which will make
a direct appeal to employed men and boys as indicated by their replies. The following points need special consideration: (1) Instruction must deal with two rather distinct classes: (a) Students proper - consisting of the small minority who seek both general and specific education with a definite student purpose, but often under rather unusual personal conditions; (b) the non-student class consisting of the large majority, who by suggestion and counsel need educational help in the solution of some present problems which will fit them for some special service. (2) The scheme of work offered must make various features of the course of study elective to a maximum degree. (3) The work must be flexible enough in its adaptation to meet individual, special, and even transient needs and conditions. (4) The subjects must be presented in small and varying units. (5) The various units of work must be so scheduled that sequential arrangement of courses is possible when it is desired. (6) All forms of work must emphasize the socialized element. (7) The work must seek to increase the student's capacity to live efficiently and largely as well as to promote the accumulation of technical knowledge and the development of manipulative skill. (8)
Much stress must be laid on the teaching itself. By suggestion and personal cooperation the teachers can awaken and develop to a high degree the mind rendered mentally inactive by former disassociation with educational forces. (9) The work must have its own distinct ideals, methods, and estimates of value. It must be based upon the current conditions and individual needs of the non-student class rather than on regular school standards which are primarily applicable to the student class.

Recommendations as to Courses for Specific Trades. The findings indicate that the number of workers employed, their desire, and their need for instruction, warrant the establishment of courses of study covering the subject matter listed under the following occupations.

In cases where two or more similar occupations call for practically the same range of instruction the occupations are grouped.

Printing Trades

Compositors, Linotype and Monotype. Evening courses in English, with special reference to spelling, punctuation, and syllabication, page arrangement of
words, principles of design as related to typography, color harmony.

For the linotype and monotype operators special instruction in the construction and mechanism of linotype and monotype machines.

The course in English should be open to all in the printing trades, whether occupied in the groups mentioned or not, and for all those engaged in the printing trades courses offering instruction in the history of the printing trade, modern methods of printing, and trade news should be organized.

Cylinder Pressmen and Press Feeders. Evening courses in the mechanism and operation of presses, composition of inks, rollers and paper, elements of the reproductive processes, modern methods of press work.

Metal Trades

Molders, Including Brass Molders. Evening courses in shop mathematics, properties and composition of irons and alloys, with special reference to furnace fixtures, outlines of history of iron making, first aid for burns and care of health in foundry conditions.
Machinists. Evening courses in shop mathematics, with special reference to calculations of working speeds, feeds, and measuring instruments, mechanical drawing, with special reference to machine parts, elements of mechanism, properties of metals, with special reference to high and low carbon steels, design of jigs and shop appliances, theory and practice of cutting tools, construction of various specialized machine tools.

If the demand proves sufficient and the resources can be provided, it is further recommended that evening classes in practical work be established in order to give breadth of experience.

Blacksmiths. Evening courses in mechanical drawing, shop mathematics, theory and practice of hardening, tempering and annealing of metals, outline history of metallurgy of iron making, first aid for burns.

Boiler Makers. Evening courses in mechanical drawing, with special reference to pattern development and different types of boilers, shop mathematics, with reference to the more simple calculations involved in computing strength of boiler shells and riveted joints,
physical principles involved in steam boiler operation.

It is recommended that mechanical drawing courses which give at first the common elements of the working drawing and which differentiate later into instruction fitting the special needs of each group, should be offered to all workers in the metal trades.

Building Trades

Carpenters, Including Bench and Machine Wood-workers and Cabinet Makers. Evening courses in architectural drawing covering detail drawing and sketching, frame and trim construction, shop arithmetic, covering fractions in two-foot rule and as related to mensuration and to simple geometric problems involved in mitering and beveling, qualities of wood, modern methods of construction and operation of wood-working machines.

Bricklayers. Evening courses in architectural drawing covering methods of brick construction, plans and elevations, figuring of drawings, courses in trade mathematics, specification making and estimating.

Sheet-metal Workers and Tinsmiths, With Which are Combined Tinsmiths and Sheet-metal Workers in the Metal
Trades. Evening courses in mechanical drawing dealing with the development and intersections (pattern drafting) comprising geometric and architectural forms and those used in tinware.

If the demand is sufficient, practical classes giving experience in construction of the more complex forms might be offered.

 Plumbers. Evening courses in blue-print and specification reading, physical and sanitary principles underlying plumbing practice, legal regulations concerning plumbing installations.

Electricians. Evening courses in the elements of electrical theory with particular relation to Ohm's law, calculations of wire capacity and testing of circuits, provisions of underwriters' code as to details of electrical installations, blue-print and specification reading.

Plasterers. Evening courses for blue-print and specification reading, properties and materials used, arithmetic as related to measurements and estimating of quantities.

In the building trades, one of the distinct possibilities presented in the development at some future
time of classes in which workers attend for part time or all day during the slack season.

Manufacturing

**Auto Mechanics.** Evening classes in automobile repair work should include instruction on the different types of automobile power plants, engine lubrication, cooling, troubles and remedies, fuel systems, electrical equipment, including ignition, batteries, starting motors, generators, car wiring and lighting, transmissions, clutches, brakes, tire repair, front axles and steering gears, frames, springs and accessories, driving rules and traffic laws, shop mathematics and plan reading. Some training in welding, either electric or acetylene, is helpful to most automobile mechanics today.

**Bakers.** Evening courses in the preparation of ingredients, mixing of straight doughs and sponges, the use and care of machines, firing ovens with coke, gas, and electricity, and regulating them, figuring costs and shop schedules, detection, elimination and prevention of bread diseases, compilation and interpretation of records used in the shop, proper formulas
for various baked goods, sanitary laws and personal hygiene, and some training in the chemistry and bacteriology of the trade.

**Core Makers.** Evening courses in the preparation and mixing of sand, packing of core boxes, removing cores, oven regulation, core baking, rodding and venting of cores, a fair understanding of molding, mechanical drawing, and some training in metallurgy.

**Furniture and Cabinet Makers.** Evening courses in mathematics, free-hand and mechanical drawing, the use of hand tools, the care, adjustment, and operation of woodworking machines and woodworking machine tools, and some training pertaining to the methods of determining costs of producing various finished pieces.

**Patternmakers.** Evening courses in blue-print reading, molding, shrinkage of materials used in metals, machine shop practices and the construction of the whole project so proper allowances can be made for fit, play, etc., proper methods of preparing and using glue, purpose of and allowance for draft in patterns, time requirement, core making, and color manipulation.
Conclusion. Numerous other courses could be offered in the evening schools provided a demand for them arose. The industrial life of a city changes and the evening school should function in such a manner that all needs of industry could and would be met promptly and efficiently.

All data, written and oral, point to the fact that a great need is felt by young men and older men, employed and unemployed, employers and employees, for a practical, constructive course of training which could best be offered in an evening school program in Terre Haute, Indiana.

If education is designed to meet the needs of any class of people it should surely meet those of the man or woman who has either been denied the privileges of education or has failed to realize its importance until later years when the necessity for advanced training and skill has been made plain to those who must make their own livelihood and that of those dependent upon them. If this need is not met in all sincerity and earnestness, then education falls short of its very reason for existence.
A. Bibliography


Industrial Survey of Terre Haute, Indiana. 1930 Chamber of Commerce.


The City Superintendent of Schools, the Principal of Gerstmeyer Technical High School, the Industrial Education department of State Teachers College, and the State Department of Vocational Education have been instrumental in perfecting plans for the improvement of Vocational Education in the schools of Terre Haute. This study is now in progress and data are being collected by a representative of State Teachers College and the city schools.

The success of this study depends upon the earnest cooperation of proprietors of local industries and those employed in such industries. You are urged to fill out promptly and carefully all blanks sent you by the above mentioned group and to aid them when they visit your establishment to study the requirements of various occupations.

The findings of this group will be used in an attempt to improve vocational education in Terre Haute. All information given will be considered confidential and will be used only for educational purposes.

Very truly,

Sec. C. Carroll, Sup't of Schools
Guy Stantz, Prin. Gerstmeyer Tch. High
State Teachers College
Committee guiding study.
GRADUATES' SUGGESTIONS for IMPROVING VOCATIONAL TRAINING at GERSTMEYER TECHNICAL HIGH SCHOOL, TILLOTSON, INDIANA.

Please answer the following questions in the light of your experiences during your training period and since you have been employed, and return the writer in the enclosed self-addressed envelope.

1. Are you now employed in the trade for which you took training at Tech? Yes____ No____. If not, why not?

2. Do you feel that you were given sufficient aid in selecting your school training program? Yes____ No____. If not, what suggestions would you offer for improving this part of the work at Gerstmeier?

3. How did you secure your first job after leaving Gerstmeier? (Please check the method or methods used as listed below.)
   Thru your shop teacher:_____
   Thru another at Gerstmeier:_____
   Thru your parents:_____
   Thru an acquaintance:_____
   Thru a newspaper ad:_____
   Some other source? Explain.

4. What jobs have you had since leaving Gerstmeier? (Please list below as nearly as you can remember them.)
   Job:_________________________ How long at job:__________
   ____________________________ ____________________________
   ____________________________ ____________________________
   ____________________________ ____________________________
   ____________________________ ____________________________
   ____________________________ ____________________________

5. What course did you take at Gerstmeier?__________
   That year did you start this training?__________
   That year did you complete this training? ________

6. If you could take more training, what kind of study would you care to take?
   That additional trade training?_________________________
   Any other training desired?_____________________________
7. Have you ever been refused a job because you were not a high school graduate? Yes  No. Describe any such experiences as to type of job, etc. 

8. Have you ever secured a job because you were a high school graduate? Yes  No. Describe job secured.

9. Do you have any other suggestions that you think would be helpful in improving Gerstmeyer's vocational education work? If so, please add them below.

Employer Questionnaire

Name of firm

Principal products

Analysis of Patternmaking (wood) as found in Terre Haute.

(Please cross out all errors listed below and add any item omitted)

1. Processes or duties of a journeyman patternmaker.
   Making a full-sized working drawing.
   Selection of the proper wood, the best grade and well seasoned.
   Cutting materials to shape and close to size.
   Assembling of parts.
   Finish shaping materials with hand tools.
   Sandpapering to finished surface and placing core prints in position.
   Shellacing pattern with gum shellac cut with alcohol.
   Core boxes constructed to best advantage of core maker and the durability of the box.
   Other duties include ____________________________

2. Numbers employed in normal years.
   Journeymen ______ apprentices ______ total__________

3. Dull and busy season.
   Dull season from _____________ to _____________
   Busy season from _____________ to _____________

4. Wages paid.
   Apprentices first year _____ per hour; other plan______.
   second year " " " " 
   third year " " " " 
   fourth year " " " " 
   Journeymen ______ per hour; __________ overtime.

5. Hours of labor.
   8-4-44 _____ 9-5-50 _____ Other plan______________

6. Entrance age.
   16 years and _____ years to learn the trade.__________
   What other plan?_________________________________

7. Supply of and demand for labor.
   Supply of medium grade workers is adequate, but for high class workmen the supply is not adequate to meet the demand.
   (If the above statement is correct for normal times please check in the blank at the end of the statement, if not, please write in the proper statement below.)

112
8. What is the source of supply of workers?
Apprentices are recruited from the elementary schools and they enter the work after they become 16 years of age.
Experienced and trained patternmakers only are employed.
Other plan used?

9. What training is needed to become a journeyman patternmaker?
In general education. An elementary school education.
In trade and technical education.
Blue print reading, a fair knowledge of nailing, a fair knowledge of metals for shrinkage effects, a knowledge of machine shop practices and the construction of the whole project to make proper allowances for fit etc.
Knowledge of the proper working of glue.
Must be skillful in the use of the hand tools of the trade and such machines as the lathe, band saw, rip and cross-cut saws, jig or scroll saw, planer, and jointer.
Should know how to keep his tools and machines in repair.
Knowledge of draft in patterns.
Knowledge of the use of finishes to prevent patterns from changing size or shape when used in damp sand, etc.
Any other training required?

10. What training does the industry give?
An apprenticeship of ____ years for boys 16 years of age or older.
In the first part of his apprenticeship, the boy is allowed to help around the machines, sandpapering, varnishing and turning coreprints in the lathe. Later he is allowed to use the machines in getting out rough stock for patterns. He is then permitted to help finish patterns by sandpapering, varnishing and the marking off of cores.
By working with journeymen and foreman, the boy learns the manipulative processes of the trade in a satisfactory manner.
No provision is made for the improvement of journeymen.
Any other plan followed for training employees?

Lack of sufficient general education?
Lack of knowledge of mechanical drawing and shop mathematics and ability to apply the knowledge they really have?
Other defects?

12. Suggestions from the trade regarding what the schools should give before boys enter the shop.
Complete elementary school education.
Courses in mechanical drawing, foundry practice, selection of woods for different kinds of patterns, shrinkage of
metals, proper construction and methods of finishing patterns to resist moisture and hard usage in the foundry. After entering the shop he should secure additional training in making of working drawings, core room and foundry practice, machine shop practice. Courses in shop mathematics.

13. When should classes be held for apprentices after they have entered the trade?
   In the evenings?
   In day classes during unemployed periods?
   In part-time classes (Sat. FRI) throughout the year?

14. Approximately how many beginners (apprentices) do you employ per year, in normal year?

15. Will you give Gerstmeyer Technical High School an opportunity to place a boy, who has had some training in this work, when you are in need of a boy?

16. Will you employ any boys to work half-time so they can remain in school to complete their vocational training?

17. Will you permit the school authorities to interview you and the boys they have placed with you to aid in securing information of use in strengthening the vocational training program of the city schools? Yes No.

18. When boys are in trouble will you refer such cases to the school authorities for aid in solving such problems? Yes No.

19. Do you favor the formation of a trade committee consisting of a representative employer, employee and city school educator to guide the training program in vocational education in Terre Haute? Yes No.
   Do you prefer such a committee with other representatives? Yes No.
   What representative members do you suggest?