THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN ANALYSIS OF WAGES AND VALUE ADDED BY MANUFACTURE IN OKLAHOMA

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

BY

KEHAR SINGH SANGHA

Norman, Oklahoma

1955

Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/133

AN ANALYSIS OF WAGES AND VALUE ADDED BY MANUFACTURE IN OKLAHOMA

APPROVED BY

W. N. Peach

Paul A. Brinker

Virgil D. Wilcox

Jim E. Riley

Percy Buchanan

THESIS COMMITTEE

ACKNOWLEDGMENT

The writer wishes to express his gratitude to the thesis committee and other members of the faculty for assistance in completing the thesis. Dr. W. Nelson Peach, Professor of Economics, deserves grateful acknowledgment for rendering invaluable help in the direction of the thesis. Helpful advice and encouragement were received from Dr. Paul A. Brinker, Associate Professor of Economics, Dr. Percy W. Buchanan, Professor of History, Dr. Charles F. Daily, Professor of Economics, Dr. Jim E. Reese, Professor of Economics, and Dr. Virgle G. Wilhite, Professor of Economics. All of them were generous in granting the writer many opportunities to discuss materials in this study.

The writer is also indebted to his colleagues for their assistance in the completion of this project. Finally, thanks are due Mrs. Dorothy Jean Peach for typing the thesis.

TABLE OF CONTENTS

Page

LIST OF TABLES..... v

Chapter

I. DEVELOPMENT OF MEASURES OF PRODUCTIVITY..... 1

II. SCOPE AND METHOD..... 12

III. TRENDS IN THE GROWTH OF MANUFACTURING IN OKLAHOMA..... 21

IV. PETROLEUM MANUFACTURING IN OKLAHOMA..... 51

V. FOOD MANUFACTURING IN OKLAHOMA..... 72

VI. MACHINERY (EXCEPT ELECTRICAL) MANUFACTURING IN OKLAHOMA..... 86

VII. PRINTING AND PUBLISHING IN OKLAHOMA..... 94

VIII. OTHER MANUFACTURING INDUSTRIES IN OKLAHOMA..... 105

IX. SUMMARY AND CONCLUSIONS..... 140

BIBLIOGRAPHY..... 149

LIST OF TABLES

Table		Page
1.	Wages of Production Workers and Value Added by Manufacture in the United States and Oklahoma, Each Census Year, 1899-1947	22
2.	Number of Manufacturing Establishments in Oklahoma and Surrounding States as a Per Cent of the United States Total, Each Census Year, 1899-1947	24
3.	Value Added by Manufacture in Oklahoma and surrounding States as a Per Cent of the United States Total, Each Census Year, 1899-1947	26
4.	Number of Production Workers in Manufacturing Industries in Oklahoma and the Surrounding States as a Per Cent of the United States Total, Each Census Year, 1899-1947	27
5.	Wages of Production Workers in Manufacturing Industries in Oklahoma and Surrounding States as a Per Cent of United States Total, Each Census Year, 1899-1947	28
6.	Income from Agriculture in the United States, Oklahoma and Surrounding States as a Per Cent of Total Income Payments, Selected Years, 1940-1953	31
7.	Income from Manufacturing in United States, Oklahoma and Surrounding States as a Per Cent of the Total Income Payments, Selected Years, 1940-1953	32
8.	Number of Employees in Manufacturing Establishments, by State, 1953	34
9.	Total Value Added by Manufacture in the United States, by States, 1947	36

LIST OF TABLES (continued)

Table		Page
10.	Hourly Earnings of Production Workers in Manufacturing Industries, by State, 1948-1954	38
11.	Wages and Value Added Per Production Worker in Manufacturing Industries in Oklahoma, by Counties, 1947	41
12.	Wages and Value Added per Production Worker in Manufacturing in Oklahoma, by Industry, 1947	44
13.	Average Hourly Wage per Production Worker in the United States and Oklahoma, Selected Manufacturing Industries, 1947	47
14.	Number of Employees and Production Workers in Petroleum Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	59
15.	Value Added by Manufacture and Wages of Production Workers in Petroleum Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	60
16.	Number of Employees and Production Workers in Food Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	75
17.	Value Added by Manufacture and Wages of Production Workers in Food Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	76
18.	Number of Employees and Production Workers in Machinery (except Electrical) Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	88
19.	Value Added by Manufacture and Wages of Production Workers in Machinery (except Electrical) Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	89

LIST OF TABLES (continued)

Table		Page
20.	Number of Employees and Production Workers in Printing and Publishing Manufacturing in the United States, Oklahoma and Other Selected States, 1947	97
21.	Value Added by Manufacture and Wages of Production Workers in Printing and Publishing Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	99
22.	Number of Employees and Production Workers in Stone, Clay, and Glass Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	108
23.	Value Added by Manufacture and Wages of Production Workers in Stone, Clay, and Glass Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	109
24.	Number of Employees and Production Workers in Fabricated Metal Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	112
25.	Value Added by Manufacture and Wages of Production Workers in Fabricated Metal Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	113
26.	Number of Employees and Production Workers in Primary Metals Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	115
27.	Value Added by Manufacture and Wages of Production Workers in Primary Metals Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	116
28.	Number of Employees and Production Workers in Chemicals and Allied Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	118

LIST OF TABLES (continued)

Table		Page
29.	Value Added by Manufacture and Wages of Production Workers in Chemicals and Allied Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	119
30.	Number of Employees and Production Workers in Lumber and Products (except Furniture) Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	121
31.	Value Added by Manufacture and Wages of Production Workers in Lumber and Products (except Furniture) Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	122
32.	Number of Employees and Production Workers in Transportation Equipment Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	124
33.	Value Added by Manufacture and Wages of Production Workers in Transportation Equipment Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	125
34.	Number of Employees and Production Workers in Furniture and Fixtures Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	126
35.	Value Added by Manufacture and Wages of Production Workers in Furniture and Fixtures Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	128
36.	Number of Employees and Production Workers in Apparel and Related Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	129
37.	Value Added by Manufacture and Wages of Production Workers in Apparel and Related Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947.....	130

LIST OF TABLES (continued)

Table		Page
38.	Number of Employees and Production Workers in Paper and Allied Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	132
39.	Value Added by Manufacture and Wages of Production Workers in Paper and Allied Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	133
40.	Number of Employees and Production Workers in Miscellaneous Manufactures in the United States, Oklahoma, and Other Selected States, 1947	134
41.	Value Added by Manufacture and Wages of Production Workers in Miscellaneous Manufactures in the United States, Oklahoma, and Other Selected States, 1947	135
42.	Number of Employees and Production Workers in Leather and Leather Products Manufacturing in the United States, Oklahoma, and Other Selected States, 1947	136
43.	Value Added by Manufacture and Wages of Production Workers in Leather and Leather Products in the United States, Oklahoma, and Other Selected States, 1947	137
44.	Number of Employees and Production Workers in All Other Major Industry Groups Manufacturing in Oklahoma and Other Selected States, 1947	138
45.	Value Added by Manufacture and Wages of Production Workers in All Other Major Industry Groups Manufacturing in Oklahoma and Other Selected States, 1947	139

AN ANALYSIS OF WAGES AND VALUE ADDED BY MANUFACTURE IN OKLAHOMA

CHAPTER I

DEVELOPMENT OF MEASURES OF PRODUCTIVITY

This study undertakes to examine the available data on productivity in manufacturing industries in Oklahoma. Although the term productivity goes far back in the writings of economists, efforts to measure productivity in statistical terms are mainly a development of the present century, and most of the studies have been made only during the past two decades. The scope and method of this study, and the available source materials are discussed in the next chapter. The remainder of this chapter is concerned with the evolution of the concept of productivity and statistical efforts to measure it.

Most studies of productivity have been concerned with changes in output over a period of time. They have been concerned with such matters as the long-run trend in output per man in specific industries, such as agriculture, mining, manufacturing, and electricity. Many others have been

concerned with the long-run trend in output of the economy as a whole. The other main type of productivity study has been concerned with comparisons of productivity in one country with that in another, or with specific industries in one country compared with similar industries in other countries. Some of these studies cover considerable periods of time, but frequently emphasize differences in productivity at a given period of time. They attempt to answer such questions as the following: What is the output per man-day, or per man-hour, or per man-year in mining in Britain, the United States, Germany, and other countries as of a given period? The present study falls in the latter category, although it is concerned with comparisons of productivity in various types of manufacturing in Oklahoma and other states, rather than productivity in different countries.

During the 18th century the Physiocrats maintained that the main source of production was land. They applied the term "produit net" to the difference between the gross output of land and the cost of producing it, including the subsistence of the cultivators. They further maintained that land, when labor is applied to it, is capable of producing a surplus or net product; whereas labor in other industries (such as commerce, transportation, and manufacturing) could not produce a surplus. Consequently, the

latter industries were "sterile".[1] Adam Smith in the Wealth of Nations (1776) advanced the view that division of labor was the main source of higher productivity. Using the famous pin manufacturing industry as an example, Smith explained the advantages of the division of labor in terms of greater dexterity of the workmen, the saving of time commonly lost in passing from one task to another, and the stimulation of invention of machinery which enables one man to accomplish the work of many.[2] Since that time various schools of thought have modified the concept of productivity. An indication of the relative newness of productivity studies is perhaps reflected in the fact that the Encyclopedia of the Social Sciences has an article on Production, but productivity is not treated in a separate essay. Text books in Economics have only recently begun to include chapters on productivity.

Sponsorship of Productivity Studies

The number of public and private agencies currently sponsoring productivity studies is large and growing. The most important federal agency is the Productivity and Technological Development Section of the Manpower and

---

[1] John Fred Bell, A History of Economic Thought (New York: The Ronald Press Company, 1953), p. 128.

[2] Ibid., 170-171.

Productivity Division of the Bureau of Labor Statistics, a part of the United States Department of Labor. The Department of Labor has made studies of productivity as far back as 1898, and there were occasional studies during the early decades of the present century. Productivity studies in the modern sense, however, received widespread support with the onset of the Great Depression of the 1930s. Facilities for making such studies were considerably expanded with the establishment of the Works Progress Administration.[3] The need for these studies became apparent with the outbreak of World War II and they have mushroomed to such an extent during the past decade that they have recently been referred to as "The New Economics",[4] a term which had been reserved for Keynesian economics for the preceding two decades. Most of the Bureau of Labor Statistics studies are published in mimeograph form and usually short summaries appear in the Monthly Labor Review.

Interest in productivity studies has not been limited to the United States. For example, in 1950 the Organization for European Economic Cooperation (O.E.E.C.) sent a technical

---

[3] Organization for European Economic Cooperation, Measurement of Productivity (Paris: OEEC, 1952), 12-13.

[4] "Economics of Growth and Development: The New Economics?", title of paper by Clarence E. Ayres, at the annual meeting of the Southwestern Social Science Association, Dallas, Texas, April 8, 1955.

mission to the United States for the purpose of studying the program of the Bureau of Labor Statistics dealing with productivity. Representatives came from Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, and the United Kingdom. The stated purpose of the mission was to obtain information which might be of value to European countries in their economic recovery efforts.[5]

The National Bureau of Economic Research is the leading private research agency which sponsors productivity studies in the United States. Although its sponsorship of these studies does not go back as far as that of the Department of Labor, productivity studies have constituted an important part of its program during the past decade and a half. Among the more important of that Bureau's studies are those of Solomon Fabricant,[6] George J. Stigler,[7] and Frederick C. Mills.[8] The Twentieth Century Fund, Incorporated has sponsored significant studies of productivity by W. S.

---

[5] Organization for European Economic Cooperation, op. cit., 5-6; also see: Anglo-American Council on Productivity, Productivity Measurements in British Industries, 1950.

[6] Solomon Fabricant, The Output of Manufacturing Industries, 1899-1937 (New York: National Bureau of Economic Research, 1940); Employment in Manufacturing, 1899-1939, (New York: National Bureau of Economic Research, 1942).

[7] George J. Stigler, Trends in Output and Employment, (New York: National Bureau of Economic Research, 1947).

[8] Frederick C. Mills, Productivity and Economic Progress (New York: National Bureau of Economic Research, Occasional Paper 38, 1952).

Woytinsky,[9] and by J. Frederic Dewhurst.[10] The Brookings Institute, of Washington D.C., another private research agency, sponsored a study by Spurgeon Bell.[11] In recent years articles dealing with productivity have appeared in a number of professional economic journals.[12]

Definition and Concepts of Productivity

In modern studies productivity is usually defined as the ratio between the output and input associated with given productivity, both measured in real terms.[13] Output can be measured either in terms of physical volume of production or in terms of dollar value of production. If interest centers on changes in output of a commodity that does not undergo significant changes in its characteristics over time (such as a kilowatt of electricity or a bushel of wheat), physical volume of production is the pertinent measure. If,

---

[9] W. S. Woytinsky and Associates, Employment in the United States (New York: The Twentieth Century Fund, 1953).

[10] J. Frederic Dewhurst and Associates, America's Needs and Resources (New York: The Twentieth Century Fund, 1947).

[11] Spurgeon Bell, Productivity, Wages, and National Income (Washington: The Brookings Institute, 1940).

[12] See: John C. Davis and Thomas K. Hitch, "Wages and Productivity," The Review of Economics and Statistics, Vol. XXXI, (November 1949), 292-298; Clark Kerr, "Short-run Behavior of Physical Productivity and Average Hourly Earnings," Ibid., 299-309; Solomon Fabricant, "Of Productivity Statistics: An Admonition," Ibid., 309-311.

[13] Irving H. Siegel, Concept and Measurements of Production and Productivity, (Washington: U. S. Bureau of Labor Statistics, 1952), 17.

however, the study is concerned with commodities that change in their characteristics (e.g. an auto, tv set, a tractor) and if it is desired to make comparisons between different commodities or commodity groups, it is usually necessary to resort to dollar value of production. When dollar value is used over a period of time, it is frequently necessary to make adjustments for changes in price levels. If comparisons are made between different countries, exchange rate adjustments are required.

A given output (product) is the result of a combination of many factors of input, such as raw materials, machines, power, worker time, and entrepreneurship. Each of these may be called an input. Since a unit of input might be one worker, one hour of labor time, one machine, one acre of land, one ton of raw materials, one kilowatt of electric power, it has generally been considered desirable to choose one yardstick of input which is present in all production. For this reason the input factor most frequently used in productivity studies is a man-hour of working time, popularly known as "labor productivity." This yardstick has the added advantage that statistical records on employment are usually more comprehensive and adequate than for any other type of input.[14] For example, the Census of Manufactures has data

---

[14] Peter O. Steiner and William Goldner, Productivity (Berkeley: Institute of Industrial Relations, 1952), 5-6.

on the volume of employment, man-hours spent in production, and wages paid for the production of manufactured goods. At the present time, data for other types of input are not available. Furthermore, it is universally recognized that the standard of living of a nation is limited ultimately by the income created per hour of work, when account is taken of the ratio of the labor force to the total population, and the hours worked per day, per week, or per year.

The concept of labor input for productivity refers to labor time expended in an establishment of an industry, either in terms of man-hours or number of workers. The man-hour concept refers to labor time only, and disregards the number of employees who worked those hours. If the number of workers is used as a measure of labor input, changes in the average work day and work week are not accounted for.[15] The Bureau of Labor Statistics suggests that the entire number of man-hours worked gives a more accurate measure of labor input. Although it would be worthwhile to weight man-hours according to the efficiency, sex, age, training, experience, and skill of the workers, so far data are not available for this type of analysis.

This definition of productivity applies to establishments in manufacturing industries, and not to transportation

---

[15] Samuel Weiss, Progress and Status of Productivity Measurement in the U.S. (Washington: U. S. Bureau of Labor Statistics, 1953), 15.

and marketing. It also excludes labor applied to the making of the machine tools, and fuel consumed in the industry's manufacturing process.[16] The labor input statistics cover the man-hours of workers classified as "production workers" in the Census of Manufactures of 1947. It excludes all administrative, engineering, and clerical workers, but includes all non-supervisory factory workers, machine operators, and material handlers.

Many publications of the Bureau of Labor Statistics convey the following broad definition of productivity.[17]

> Output per man-hour refers to production, in physical units, per man-hour of work. It is a measure of the relationship between the volume of goods produced and one factor of input-labor time. The indexes do not measure the specific contribution of labor or of capital or of any other factor of production. Changes in the ratio between output and man-hours of work show the joint effect of large number of separate, though interrelated, influences such as technological improvements, the rate of operations, the relative contribution of production of plants at different levels of efficiency, the flow of materials and components, as well as the skill and effect of the work force, the efficiency of management, and the status of labor relations.

The labor input factor could mean labor expended for a definite group of operations, or it could include the preliminary work for the manufacture of the raw materials and part of the labor input corresponding to the manufacture of

---

[16] Ibid., 15-16.

[17] U. S. Bureau of Labor Statistics, Relationship between Productivity Measurements. (Date of publication not given).

the equipment and other allied parts of the machinery. The definition used by the Bureau of Labor Statistics corresponds with the value added through the process of manufacture only. The Bureau of Labor Statistics is concerned only with the rate of productivity, and not with efforts to calculate the labor cost of production. The labor measurement unit may be the worker, the hour, or the week of work, but the Bureau of Labor Statistics uses hours of work. All hours of work are counted in the same way, and no distinction is made between hours worked by male and female workers, skilled or apprentice workers, and normal day or night or overtime work.

In its analysis of man-hours the Bureau of Labor Statistics faced another problem of distinguishing between man-hours paid and man-hours worked. The concept of "man-hours paid for" is generally used in the United States labor statistics that cover all hours paid for, inclusive of hours not worked such as reporting time, rest periods, sick leave, holidays, and paid vacations. It has been easier to collect such figures. These hours also provide a more useful measure of labor time required for production within the framework of existing industrial and legal institutions and practices.[18] They signify the gross amount of labor that must be purchased

[18] Weiss, op. cit., 15-16.

for continued production. Essentially, the "hours paid for" concept reflects the major role of human factors in current production.

Uses of Productivity Data

Productivity data are useful as a measure of the economic efficiency and well-being of a nation in time of peace. They are equally important in time of mobilization for war. They throw light on the trends in output of individual industries such as agriculture, mining, and manufacturing. They make it possible to measure the rates of improvement in output between one segment of the economy and another over long periods of time. For example, we have studies of the trends in relative efficiency in the agricultural and industrial segments of the economy extending back over many decades. Productivity data make it possible to compare the relative efficiency of industries in one geographic area with similar industries in other areas, which is the purpose of the present study. Such studies have become a fundamental part of efforts to determine the relative importance of the factors responsible for economic growth.

CHAPTER II

SCOPE AND METHOD

The third chapter of the study is a brief survey of some of the highlights of manufacturing development in Oklahoma, the states surrounding Oklahoma, and in the nation. The purpose of the chapter is to provide perspective for the analysis of individual manufacturing industries in Oklahoma, which constitutes the subject matter of Chapters IV-VIII. The four most important manufacturing industries (petroleum, food manufacturing, machinery, and printing and publishing) are analyzed in separate chapters (IV-VII). The remaining manufacturing industries in the state, of relatively minor importance, are treated in Chapter VIII. The summary and conclusions are in Chapter IX.

The purpose of the study is to measure the performance of individual manufacturing industries in Oklahoma and compare this performance with that in similar industries in other parts of the nation. Each of the important manufacturing industries in the state is compared with the national average, or national total. The next step is to compare performance in Oklahoma with that in surrounding states

(which are designated as Group A states in the tables). These states are Texas, Kansas, Arkansas, Missouri, Colorado, and New Mexico.

Another group of states (Group B in the tables) consists of the five states in which value added in the manufacturing industry under discussion was the highest in the nation. There is some overlapping between Group A and Group B states. For example, in petroleum manufacturing Texas appears as a surrounding state (Group A) and also as one of the five states in which value added in petroleum manufacturing was the highest in the nation (Group B). The overlapping among different groups is, however, rare and does not distort the comparisons in any significant way. The purpose of including these states is to determine how Oklahoma's manufacturing industries rank in comparison with states in which a particular type of manufacturing is important.

The final group of states (Group C) consists of those in which value added by manufacture (e.g. in petroleum) was within the range of 50 per cent above that in Oklahoma in 1947 or 50 per cent below the Oklahoma figure. The states in this group vary from one type of manufacturing industry to another. The number of these states also varies. Finally, it should be noted that in most instances these states are widely separated geographically. The purpose of including this group of states is to make it possible to compare per-

formance of individual manufacturing industries in Oklahoma with performance in other states in which that type of manufacturing is generally about as important as in Oklahoma.

It is felt that these four kinds of comparisons (with the United States, the surrounding states, the five states in which value added was highest in the nation, and the states in which the particular type of manufacturing industry was about as important as in Oklahoma) will provide a rounded view of Oklahoma's principal manufacturing industries. For example, one might get a distorted view if comparison is limited to Oklahoma and the five states in which value added is highest, because in the latter states the firms and establishments may be principally the larger, more efficient ones.

The analysis is limited mainly to three principal phases of manufacturing activity: (1) the number of employees and the number of production workers, (2) value added by manufacture in 1947, and (3) wages and salaries, including total wages, annual average wages, and hourly wage rates. The definition of these items is provided later in this chapter.

The data used for the analysis refer to the Census year, 1947. Thus, the study is essentially concerned with performance as of a given period of time, as distinguished from a large number of studies extending over relatively long periods of time. The reason for limiting the study to

a single year (except for the survey data in Chapter III) is that this is the only year for which comparable data are available. It is to be hoped that in the future the Census of Manufactures will provide data which will also make it possible to analyze trends in Oklahoma and other parts of the nation over a period of time.

The primary source of data on the number of establishments, employees, production workers, value added by manufacture, wages and salaries of employees, and wages and man-hours of production workers are obtained from the Census of Manufactures: 1947. The Census of Manufactures for 1947 is the first to be taken since 1939. The first Census of Manufactures in the United States covered the year 1809 and a census was taken decennially thereafter up to and including 1899, with the exception of 1829. It was conducted quinquennially from 1904 through 1919, and every other year from 1921 through 1939 but was suspended during the war period. The 1947 census is the most recent, although present legislation provides for a Census of Manufactures to cover the year 1953 and every fifth year thereafter.[1] The scheduled census for 1953 was, however, delayed.

In the censuses prior to 1947, data for man-hours of production workers are not available in comprehensive form

---

[1] U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U.S. Government Printing Office, 1950), 1.

although such figures are available for some industries from 1933 through 1939. Many types of data, however, in the Census of Manufactures: 1947 are not comparable with data for previous census years.

For example, in 1939 and earlier census years establishments having less than $500 value of products were designated as outside the scope of the Census of Manufactures.[2] In the 1947 census no value size was used. Furthermore, establishments primarily engaged in certain industries (such as coffee and spices; roasting and grinding; and tobacco stemming and redrying) were considered as manufacturing industries in the 1947 census, but were classified as nonmanufacturing in 1939. On the other hand, the 1947 census excluded dry food packers, retail establishments manufacturing ice cream, independent retail bakeries, and machine shops engaged in repair work, but they were included in the 1939 census.[3]

"An establishment" signifies a single plant or factory and is not necessarily identical with the business unit or company which may consist of one or more establishments.[4] A company operating establishments at more than one location is required to submit a report for each location. Also,

---

[2] Ibid., 4.

[3] Ibid., 5.

[4] Ibid., 2.

companies engaged in distinctly different lines of activity at one location are required to submit separate reports if separate pay roll and inventory records are kept for each activity.

"All employees" consist of full and part-time persons on the pay rolls of reporting establishments who worked or received compensation for any part of the 12 pay periods covered in the census year, including persons on paid sick leave, paid holidays, and paid vacation.[5] Members of the armed forces and pensioners carried on the active rolls but not working during the period are excluded. In like manner, "production workers," closely comparable to "wage earners" in the 1939 census classification, comprise working foremen and nonsupervisory workers engaged in fabricating, handling, packing, warehousing, shipping, maintenance, repair, janitorial and watchman services, product development, auxiliary production for plant's own use, record-keeping, and other services closely associated with these production operations.[6]

"Wages and salaries" are defined as the gross earnings of employees, including commissions, dismissal pay, nonproduction bonuses, vacation and sick leave pay, and compensation in kind; and prior to such deductions as employees'

---

[5] Ibid., 12-13.

[6] Ibid., 13.

Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds.[7]

"Value added by manufacture" is calculated by subtracting the cost of materials, supplies, containers, purchased electric energy, and contract work from the total value of shipments.[8] In other words, it approximates the value created by the process of manufacture.

"A man-hour" is defined as one hour of work by one person regardless of whether on regular time or overtime.[9] Accordingly, this unit of work is considered to provide the most comprehensive measure of labor input available since it takes into account both number of production workers and hours of work. The total man-hours reported by the establishments pertain only to the production and related workers, and not to all employees.

Method of Approach

The 1947 Census of Manufactures includes data for 20 major industry groups for the United States, and data for as many individual states as feasible. Data are available for 15 manufacturing industries in Oklahoma. The other five (tobacco manufacture; textile mill products; rubber, electrical machinery; and instruments) were so small in Oklahoma that state data were not provided.

---

[7] Ibid., 13.

[8] Ibid., 18.

[9] Ibid., 14.

After considerable experimentation, two sets of basic tables were prepared for each of the 15 manufacturing industries for which Oklahoma data were available. One set of tables contains data on the total number of employees, the number of production workers, total wages of all employees, and total wages paid production workers. Data were compiled first for Oklahoma and the United States. Selection of states to be included in Group A was determined automatically. This group includes the states which are geographically contiguous to Oklahoma. Selection of states to be included in Group B was made by ranking all states for which data for the particular type of manufacturing were available on the basis of value added by manufacture. The state showing the highest value added was ranked at the top, then the next highest, and so on until the state with the smallest value added. The five highest states for each type of manufacture were included in Group B. This ranking of the states according to value added also provided the basis for selecting states in Group C. Using "value added" in the particular type of industry in Oklahoma as equal to 100, the range 50 per cent above and below that figure was computed. All states falling within the range were included in Group C. Computations were based on the basic data in the tables. The second set of tables contains data on value added by manufacture in each industry group and the hourly wage rate

of production workers in 1947. Computations were based on data in both sets of tables.

Data on average annual wages per production worker for each industry were obtained by dividing total wages paid production workers by the number of production workers. It was possible to test the reasonableness of this method by computing an annual average wage in a different manner. The method was to multiply the average hourly wage per production worker by 2,000. The assumption was a 40-hour week for 50 weeks in the year. The results obtained by this method were then compared with those from the first method. There were, of course, differences in the results obtained from the different methods. More important than the differences, however, were the similarities in results. Consequently, data obtained by the first method were used throughout the study, and data from the second method are not shown in the tables. One of the negative conclusions that can reasonably be inferred from a comparison of the results of the two methods is that the average annual wage of production workers in most industries is not significantly biased by such factors as seasonal variations.

CHAPTER III

TRENDS IN THE GROWTH OF MANUFACTURING IN OKLAHOMA

During the past half century there was a spectacular growth in manufacturing in the United States. At the beginning of the century manufacturing was concentrated largely on the eastern coastal area, and some on the west coast. Gradually manufacturing spread to other parts of the country. Value added by manufacture increased fifteen-fold during the past 50 years, and amounted to $75 billion in 1947. The number of production workers in manufacturing rose from less than 5 millions to about 12 millions. Manufacturing is the largest employer of labor in the United States. During the same period wages of production workers rose from less than $2 billion to more than $30 billion. (Table 1).

The growth of manufacturing industries in the southwestern states has occurred mainly in recent decades. At the beginning of the century Oklahoma had almost no manufacturing, but recently the state has attracted some of the more important industries such as petroleum, food manufacturing, machinery, printing and publishing, and others. The result has been that, while Oklahoma is still not listed as

TABLE 1

WAGES OF PRODUCTION WORKERS AND VALUE ADDED BY MANUFACTURE IN THE UNITED STATES AND OKLAHOMA, CENSUS YEAR, 1899-1947*

Year	United States			Oklahoma		
	Wages (millions of dollars)	Value Added (millions of dollars)	Wages as Per Cent of Value Added	Wages (millions of dollars)	Value Added (millions of dollars)	Wages as Per Cent of Value Added
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1899	1,892	4,647	40.7	1	3	33.3
1904	2,441	6,019	40.6	3	8	37.5
1909	3,205	8,160	39.3	7	20	35.0
1914	3,782	9,386	40.3	11	31	35.5
1919	9,664	23,842	41.8	34	88	38.6
1921	7,451	17,253	43.2	30	80	37.5
1923	10,149	24,569	41.3	33	85	38.8
1925	9,980	25,668	38.9	34	102	33.3
1927	10,099	26,325	38.4	36	102	35.3
1929	10,885	30,591	35.6	41	149	27.5
1931	6,688	18,600	36.0	26	68	38.2
1933	4,940	14,008	35.3	21	66	31.8
1935	7,311	18,552	39.4	24	77	31.2
1937	10,113	25,174	40.2	34	111	30.6
1939	8,998	24,487	36.7	30	102	29.4
1947	30,242	74,426	40.6	105	341	30.8

*Source: U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950), Table 1, pp. 21 and 495.

an important manufacturing center compared with some other areas, value added by manufacture increased a hundred-fold since the beginning of the present century. In 1899 there were only 495 manufacturing establishments in the state and most of them were small. By 1947 the number had grown to 1,740. The number of production workers in manufacturing rose from less than 2,500 in 1899 to 44,000 in 1947, while their wages increased from less than $1 million to more than $100 million during the same period.

In 1899 only two-tenths of one percent of the number of manufacturing establishments in the nation were located in Oklahoma. In Oklahoma and the six surrounding states (Texas, Missouri, Kansas, Colorado, Arkansas, and New Mexico) there was 7.7 percent of the total number of manufacturing establishments. (Table 2). More than half of these establishments were located in Missouri and Texas. The growth in the number of manufacturing establishments in Oklahoma during the first decade of the present century was more rapid than in the rest of the nation, and in 1909 Oklahoma accounted for nine-tenths of one percent of the total. There has been little change in Oklahoma's percentage of the national total since that time. Texas has become relatively more important than at the beginning of the century, while Missouri's percentage of the national total has been reduced.

Most of the manufacturing establishments in Oklahoma

TABLE 2

NUMBER OF MANUFACTURING ESTABLISHMENTS IN OKLAHOMA AND SURROUNDING STATES AS A PER CENT OF THE UNITED STATES TOTAL, EACH CENSUS YEAR, 1899-1947*

Census Year (1)	ESTABLISHMENTS AS A PER CENT OF UNITED STATES TOTAL IN: Oklahoma (2)	Texas (3)	Missouri (4)	Kansas (5)	Colorado (6)	Arkansas (7)	New Mexico (8)
1899	0.2	1.5	3.3	1.1	0.6	0.8	0.1
1904	0.5	1.5	3.0	1.2	0.8	0.9	0.1
1909	0.9	1.7	3.2	1.3	0.8	1.1	0.1
1914	0.9	1.9	3.1	1.2	0.8	1.0	0.1
1919	0.8	2.0	3.0	1.2	0.8	1.1	0.1
1921	0.7	1.8	2.8	1.0	0.8	0.7	0.1
1923	0.6	1.9	2.8	0.9	0.7	0.6	0.1
1925	0.7	2.0	2.8	1.0	0.8	0.7	0.1
1927	1.1	2.2	2.9	0.9	0.8	0.6	0.1
1929	0.8	2.5	2.8	0.9	0.7	0.8	0.1
1931	0.8	2.5	2.8	0.9	0.8	0.6	0.1
1933	0.8	2.6	2.7	0.9	0.8	0.6	0.1
1935	0.8	2.5	2.6	0.9	0.7	0.6	0.1
1937	0.8	2.6	2.6	0.9	0.7	0.6	0.1
1939	0.9	2.9	2.6	0.8	0.7	0.6	0.2
1947	0.7	3.0	2.4	0.8	0.7	0.8	0.2

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950).

have been relatively small and while the number of establishments gives some indication of relative growth, other measures of growth are needed to avoid misinterpretation. In 1899 Oklahoma accounted for less than one-tenth of one percent of the value added by manufacturing in the nation. Oklahoma's share of the total rose steadily during the first two decades of the present century and amounted to four-tenths of one per cent in 1919. (Table 3). Its share of the national total has remained virtually unchanged since that time. Thus, during the past three decades the growth of manufacturing in Oklahoma (measured by value added) has about kept pace with the rest of the nation. During that period Texas has about doubled its share of the national total; Missouri's share declined somewhat; in Kansas, Colorado, and Arkansas change has been relatively unimportant. As a group, the seven states accounted for 5.4 per cent of the national total in 1899, and 6.4 in 1947.

Similar trends may be observed in the relative growth in the number of production workers in manufacturing and in their wages. (Tables 4 and 5). At the beginning of the century the number of workers in manufacturing in Oklahoma and the surrounding states accounted for 5.1 per cent of the national total, while wages of production workers were 5.3 per cent. By 1947 the number of production workers had risen to 6.1 per cent of the national total, but wages

TABLE 3

VALUE ADDED BY MANUFACTURE IN OKLAHOMA AND SURROUNDING STATES AS A PER CENT OF THE UNITED STATES TOTAL, EACH CENSUS YEAR, 1899-1947*

Census Year (1)	VALUE ADDED AS A PER CENT OF UNITED STATES TOTAL IN: Oklahoma (2)	Texas (3)	Missouri (4)	Kansas (5)	Colorado (6)	Arkansas (7)	New Mexico (8)
1899	...[a]	0.8	2.8	0.7	0.6	0.5	...[a]
1904	0.1	1.0	3.1	0.7	0.6	0.5	...[a]
1909	0.2	1.2	2.7	0.8	0.6	0.5	...[a]
1914	0.3	1.2	2.6	0.7	0.5	0.4	...[a]
1919	0.4	1.2	2.2	0.7	0.4	0.4	...[a]
1921	0.5	1.6	2.5	0.8	0.4	0.3	...[a]
1923	0.3	1.4	2.4	0.6	0.4	0.3	...[a]
1925	0.4	1.5	2.4	0.6	0.4	0.3	...[a]
1927	0.4	1.4	2.5	0.6	0.4	0.3	...[a]
1929	0.5	1.5	2.5	0.7	0.4	0.3	...[a]
1931	0.4	1.5	2.6	0.7	0.4	0.2	...[a]
1933	0.5	1.7	2.7	0.7	0.4	0.3	...[a]
1935	0.4	1.6	2.4	0.6	0.3	0.2	...[a]
1937	0.4	1.7	2.2	0.5	0.4	0.3	...[a]
1939	0.4	1.8	2.4	0.5	0.4	0.3	...[a]
1947	0.4	2.3	2.2	0.6	0.4	0.4	0.1

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950).

[a]Less than one-tenth of 1 per cent.

TABLE 4

NUMBER OF PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES IN OKLAHOMA AND THE SURROUNDING STATES AS A PER CENT OF THE UNITED STATES TOTAL, EACH CENSUS YEAR, 1899-1947*

Census Year (1)	PRODUCTION WORKERS AS A PER CENT OF UNITED STATES TOTAL IN: Oklahoma (2)	Texas (3)	Missouri (4)	Kansas (5)	Colorado (6)	Arkansas (7)	New Mexico (8)
1899	0.2	0.8	2.4	0.6	0.4	0.7	...[a]
1904	0.1	0.9	2.6	0.7	0.4	0.6	0.1
1909	0.2	1.1	2.4	0.7	0.4	0.7	0.1
1914	0.3	1.1	2.3	0.6	0.4	0.6	...[a]
1919	0.3	1.2	2.3	0.7	0.4	0.6	0.1
1921	0.3	1.4	2.4	0.7	0.4	0.5	0.1
1923	0.3	1.2	2.4	0.6	0.4	0.5	0.1
1925	0.3	1.4	2.5	0.6	0.4	0.6	...[a]
1927	0.4	1.5	2.5	0.6	0.4	0.5	...[a]
1929	0.4	1.6	2.4	0.6	0.4	0.5	...[a]
1931	0.4	1.5	2.5	0.6	0.4	0.4	...[a]
1933	0.4	1.6	2.4	0.6	0.4	0.4	...[a]
1935	0.3	1.4	2.2	0.4	0.3	0.4	...[a]
1937	0.3	1.5	2.2	0.4	0.3	0.4	...[a]
1939	0.4	1.6	2.2	0.4	0.3	0.4	...[a]
1947	0.4	2.0	2.3	0.5	0.4	0.5	...[a]

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950).

[a]Less than one-tenth of 1 per cent.

TABLE 5

WAGES OF PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES IN OKLAHOMA AND SURROUNDING STATES AS A PER CENT OF UNITED STATES TOTAL, EACH CENSUS YEAR, 1899-1947*

Census Year (1)	WAGES OF PRODUCTION WORKERS AS A PER CENT OF UNITED STATES TOTAL IN: Oklahoma (2)	Texas (3)	Missouri (4)	Kansas (5)	Colorado (6)	Arkansas (7)	New Mexico (8)
1899	...[a]	0.9	2.5	0.7	0.6	0.5	0.1
1904	0.1	1.0	2.7	0.8	0.6	0.6	0.1
1909	0.2	1.2	2.5	0.8	0.6	0.6	0.1
1914	0.3	1.2	2.4	0.7	0.5	0.5	0.1
1919	0.3	1.2	2.0	0.7	0.4	0.5	0.1
1921	0.4	1.4	2.4	0.8	0.5	0.4	0.1
1923	0.3	1.1	2.2	0.6	0.4	0.4	0.1
1925	0.3	1.2	2.3	0.6	0.4	0.4	...[a]
1927	0.4	1.3	2.3	0.6	0.4	0.3	...[a]
1929	0.4	1.4	2.2	0.6	0.4	0.4	...[a]
1931	0.4	1.5	2.4	0.6	0.4	0.3	...[a]
1933	0.4	1.5	2.4	0.6	0.4	0.3	...[a]
1935	0.3	1.2	2.1	0.4	0.3	0.2	...[a]
1937	0.3	1.3	2.0	0.4	0.2	0.2	...[a]
1939	0.3	1.4	2.1	0.4	0.3	0.3	...[a]
1947	0.3	1.8	2.0	0.5	0.4	0.3	...[a]

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950).

[a]Less than one-tenth of 1 per cent.

remained relatively unchanged at 5.3 per cent. As will be indicated in greater detail in later chapters, hourly wage rates and average annual wages in manufacturing industries in Oklahoma and many surrounding states are somewhat below the national average. Generally lower hourly wage rates largely explain the fact that Oklahoma and surrounding states account for a larger percentage of the national total of the number of production workers than of production worker wages. This generalization, however, is subject to numerous and important qualifications.

The various measures of growth in manufacturing in Oklahoma and surrounding states during the past half century seem to suggest that the rate of growth in these states has been moderately greater than the national average. The fact must not be overlooked, however, that during this same period the United States emerged as the world's most important manufacturing nation. It is significant, then, that the rate of growth in Oklahoma and surrounding states not only kept pace with the national average, but also showed some gain relative to other parts of the nation.

Perhaps of greater significance, manufacturing has become more important as a source of income for the people in Oklahoma and surrounding states during the past half century, and especially in recent decades. As late as 1940 agriculture produced a much larger share of the income of

the people in each of these states than the national average, and except for Missouri and Colorado, agriculture produced at least twice as large a share of total income in these states as it did for the nation as a whole. (Table 6). Since that time agriculture has declined and manufacturing has increased relatively in each of the seven states, although agriculture still accounts for a larger share of total income in these states than in the other parts of the nation.

In 1940 and at the present time manufacturing produced a smaller share of income in Oklahoma and the surrounding states than the national average. On the other hand, in each of these states manufacturing accounted for a significantly larger share of total income in 1953 than it did in 1940. (Table 7). Except for New Mexico, manufacturing accounts for a larger share of total income in each of the surrounding states than it does in Oklahoma.

In the remainder of the study our attention will be centered mainly on the analysis of specific manufacturing industries in Oklahoma. Most of the data refer to the calendar year 1947. In order to place the analysis in proper perspective, a brief comment on the relative standing of manufacturing in Oklahoma and other states may be helpful. The data are the latest available at the time of writing.

Oklahoma's population ranks 26th from the top among

TABLE 6

INCOME FROM AGRICULTURE IN UNITED STATES, OKLAHOMA AND SURROUNDING STATES AS A PER CENT OF TOTAL INCOME PAYMENTS, SELECTED YEARS, 1940-1953*

Year	United States	Oklahoma	Texas	Missouri	Kansas	Colorado	Arkansas	New Mexico
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1940	7.2	18.0	15.1	9.6	18.7	10.9	30.0	20.6
1948	10.2	18.3	14.8	15.9	24.0	16.5	32.6	15.3
1949	8.0	16.1	17.8	11.4	19.6	15.0	25.5	16.5
1950	7.4	11.0	13.3	11.8	19.7	10.9	24.5	12.4
1951	7.6	12.0	13.4	11.3	14.6	11.7	24.8	15.8
1952	6.7	11.8	10.6	9.4	22.3	11.0	22.0	12.4
1953	5.3	8.2	8.0	7.8	8.5	7.6	19.5	8.4

*Source: Compiled from various issues (August) of U. S. Department of Commerce, Survey of Current Business.

TABLE 7

INCOME FROM MANUFACTURING IN UNITED STATES, OKLAHOMA AND SURROUNDING STATES AS A PER CENT OF TOTAL INCOME PAYMENTS, SELECTED YEARS, 1940-1953*

Year	United States	Oklahoma	Texas	Missouri	Kansas	Colorado	Arkansas	New Mexico
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1940	20.3	7.3	9.0	16.6	8.7	8.4	8.4	2.4
1948	22.4	8.1	10.9	18.4	10.0	9.6	8.9	4.8
1949	22.1	8.2	10.6	19.1	11.5	9.5	9.9	3.8
1950	22.6	8.6	11.2	19.2	11.6	10.0	10.6	4.7
1951	23.9	9.4	12.2	20.1	15.4	10.5	10.9	5.4
1952	24.5	10.2	13.0	21.9	15.7	10.8	11.9	6.3
1953	25.7	11.3	13.9	23.5	18.6	11.5	12.7	6.5

*Source: Compiled from various issues (August) of U. S. Department of Commerce, Survey of Current Business.

the states. It ranks 38th from the top in per capita income. In 1953 it ranked 33rd from the top on the basis of the number of employees in manufacturing establishments. (Table 8). The most recent data available on value added by manufacture by states refer to 1947. In that year Oklahoma ranked 32nd from the top among the 48 states. (Table 9). Average hourly wages for production workers in manufacturing are available for the calendar year 1954. The average hourly wage of all production workers in manufacturing industries in Oklahoma was $1.72. Among the states Oklahoma's wage rate ranked 28th from the top. The Oklahoma average hourly wage was the same as that in Missouri. Compared with other surrounding states, the hourly rate in Oklahoma was higher than that in Arkansas, and below the rate in New Mexico, Kansas, Colorado, and Texas. (Table 10).

On the basis of value added, most of the manufacturing activity in Oklahoma is found in a relatively small number of the state's 77 counties. (Table 11). About half of it is located in Oklahoma and Tulsa counties. If Kay, Garfield, and Okmulgee counties are added, the first five account for two-thirds of the state total. When five additional counties are included (Muskogee, Creek, Pontotoc, Washington, and Canadian), the top ten counties account for more than three-fourths of the total.

The state's principal types of manufacturing industries

TABLE 8

NUMBER OF EMPLOYEES IN MANUFACTURING ESTABLISHMENTS, BY STATE, 1953*

State	Annual Average (thousands)	Rank
(1)	(2)	(3)
New York	2,016.6	1
Pennsylvania	1,619.3	2
Ohio	1,421.4	3
Illinois	1,326.1	4
Michigan	1,219.1	5
California	1,063.7	6
New Jersey	884.8	7
Massachusetts	737.9	8
Indiana	674.2	9
Wisconsin	472.2	10
Connecticut	455.8	11
North Carolina	449.4	12
Texas	437.8	13
Missouri	414.3	14
Georgia	316.0	15
Tennessee	291.4	16
Maryland	268.9	17
Virginia	255.9	18
Alabama	234.2	19
South Carolina	225.8	20
Minnesota	224.3	21
Washington	195.3	22
Iowa	172.1	23
Louisiana	162.1	24
Kentucky	159.9	25
Rhode Island	145.6	26
Oregon	143.2	27
Kansas	138.6	28
West Virginia	136.0	29
Florida	121.4	30

(continued on next page)

TABLE 8 (continued)

State	Annual Average (thousands)	Rank
(1)	(2)	(3)
Maine	114.1	31
Mississippi	97.7	32
Oklahoma	84.8	33
Arkansas	82.7	34
New Hampshire	82.2	35
Colorado	68.3	36
Delaware	62.1	37
Nebraska	61.3	38
Vermont	40.5	39
Utah	32.4	40
Arizona	28.0	41
Idaho	23.5	42
Montana	18.4	43
District of Columbia	17.3	44
New Mexico	16.3	45
South Dakota	12.0	46
Wyoming	6.5	47
North Dakota	6.3	48
Nevada	4.3	49

*Source: U. S. Bureau of Labor Statistics, Employment and Earnings, (May 1954), Table SA-11, p. 69.

TABLE 9

TOTAL VALUE ADDED BY MANUFACTURE IN THE UNITED STATES, BY STATES, 1947*

State	Value Added by Manufacture (millions of dollars)	Rank
New York	9,667	1
Pennsylvania	6,947	2
Illinois	6,680	3
Ohio	6,359	4
Michigan	5,196	5
New Jersey	4,177	6
California	3,995	7
Massachusetts	3,370	8
Indiana	2,978	9
Wisconsin	2,261	10
Connecticut	1,897	11
Texas	1,727	12
North Carolina	1,647	13
Missouri	1,623	14
Maryland	1,138	15
Virginia	1,052	16
Minnesota	1,023	17
Georgia	1,016	18
Tennessee	958	19
Alabama	877	20
Washington	874	21
South Carolina	794	22
Kentucky	741	23
Louisiana	694	24
Oregon	675	25
Iowa	671	26
West Virginia	664	27
Rhode Island	658	28
Kansas	461	29
Maine	432	30
Florida	350	31
Oklahoma	341	32
New Hampshire	307	33
Mississippi	300	34
Colorado	287	35

(continued on next page)

TABLE 9 (continued)

State	Value Added by Manufacture (millions of dollars)	Rank
Arkansas	265	36
Nebraska	261	37
Delaware	182	38
Vermont	150	39
Utah	128	40
Idaho	110	41
Arizona	104	42
District of Columbia	99	43
Montana	92	44
New Mexico	55	45
South Dakota	51	46
Wyoming	35	47
North Dakota	29	48
Nevada	28	49

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950).

TABLE 10

HOURLY EARNINGS OF PRODUCTION WORKERS IN MANUFACTURING INDUSTRIES, BY STATE, 1948-1954*

State	AVERAGE HOURLY EARNINGS (dollars)							
	1948	1949	1950	1951	1952	1953	1954[a]	Rank[b]
Alabama		$1.10	$1.18	$1.27	$1.31	$1.39	$1.42	41
Arizona	$1.34	1.43	1.46	1.60	1.76	1.88	1.93	9
Arkansas		0.94	1.02	1.09	1.14	1.21	1.23	47
California	1.53	1.60	1.65	1.77	1.87	1.97	2.02	6
Colorado				1.55	1.63	1.74	1.79	22
Connecticut	1.34	1.37	1.43	1.58	1.67	1.77	1.79	23
Delaware	1.31	1.37	1.42	1.53	1.62	1.71	1.76	24
Florida	0.96	1.00	1.09	1.17	1.26	1.31	1.34	43
Georgia		1.00	1.08	1.16	1.20	1.26	1.27	44
Idaho				1.71	1.83	1.87	1.83	18
Illinois	1.43	1.49	1.52	1.67	1.75	1.86	1.89	11
Indiana	1.43	1.50	1.57	1.71	1.78	1.89	1.91	10
Iowa		1.36	1.40	1.55	1.62	1.69	1.73	25
Kansas		1.35	1.43	1.58	1.68	1.79	1.85	14
Kentucky					1.49	1.62	1.67	32
Louisiana			1.25	1.34	1.41	1.53	1.59	33
Maine	1.16	1.15	1.19	1.31	1.35	1.40	1.42	42
Maryland			1.36	1.49	1.58	1.66	1.71	29
Massachusetts			1.38	1.50	1.57	1.65	1.68	30
Michigan	1.55	1.62	1.72	1.86	1.98	2.09	2.12	2

(continued on next page)

TABLE 10 (continued)

State	AVERAGE HOURLY EARNINGS (dollars)							
	1948	1949	1950	1951	1952	1953	1954[a]	Rank[b]
Minnesota	$1.30	$1.37	$1.44	$1.55	$1.66	$1.76	$1.82	19
Mississippi			0.97	1.03	1.09	1.14	1.16	48
Missouri		1.32	1.38	1.50	1.58	1.69	1.72	27
Montana			1.61	1.75	1.86	1.93	1.98	7
Nebraska			1.26	1.38	1.46	1.57	1.68	31
Nevada			1.69	1.79	1.94	2.08	2.11	3
New Hampshire	1.16	1.18	1.21	1.34	1.38	1.42	1.43	39
New Jersey	1.39	1.45	1.51	1.64	1.73	1.82	1.86	13
New Mexico		1.26	1.38	1.56	1.66	1.80	1.87	12
New York	1.44	1.49	1.52	1.63	1.70	1.79	1.84	16
North Carolina	1.01	1.05	1.10	1.18	1.20	1.23	1.25	45
North Dakota			1.23	1.33	1.42	1.48	1.49	37
Ohio					1.83	1.95	1.97	8
Oklahoma	1.22	1.29	1.35	1.48	1.56	1.69	1.72	28
Oregon			1.79	1.94	2.05	2.12	2.13	1
Pennsylvania	1.33	1.38	1.43	1.59	1.66	1.79	1.81	20
Rhode Island	1.23	1.23	1.28	1.40	1.48	1.52	1.52	34
South Carolina		1.05	1.11	1.19	1.20	1.24	1.25	46
South Dakota			1.28	1.35	1.42	1.47	1.51	35
Tennessee	1.06	1.12	1.19	1.29	1.34	1.40	1.44	38
Texas	1.21	1.27	1.35	1.48	1.57	1.68	1.73	26
Utah		1.38	1.42	1.57	1.66	1.79	1.85	15
Vermont		1.14	1.21	1.33	1.39	1.46	1.50	36
Virginia			1.18	1.27	1.33	1.40	1.43	40
Washington	1.60	1.65	1.73	1.87	1.97	2.04	2.08	4

(continued on next page)

TABLE 10 (continued)

State	AVERAGE HOURLY EARNINGS (dollars)							
	1948	1949	1950	1951	1952	1953	1954[a]	Rank[b]
West Virginia				1.58	1.66	1.78	1.80	21
Wisconsin	1.34	1.40	1.47	1.62	1.70	1.78	1.84	17
Wyoming			1.74	1.83	1.89	1.99	2.07	5

*Source: U. S. Bureau of Labor Statistics, Employment and Earnings, (May 1954), Table C-6, pp. 41-43; Table SC-2, pp. 108-116.

a March only.

b Ranked on basis of hourly wage for March 1954.

TABLE 11

WAGES AND VALUE ADDED PER PRODUCTION WORKER IN MANUFACTURING INDUSTRIES IN OKLAHOMA, BY COUNTIES, 1947*

State and Counties	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Value Added in Each County as Per Cent of State Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State Total	44,302	105,277	341,027	2,376	7,698	30.9	
COUNTIES							
Adair	121	116	218	959	1,802	53.2	0.06
Alfalfa	170	321	800	1,888	4,706	40.1	0.23
Atoka	32	43	137	1,344	4,281	31.4	0.04
Beaver	(d)	(d)	(d)				
Beckham	255	460	1,759	1,804	6,898	26.2	0.52
Blaine	307	703	3,486	2,290	11,355	20.2	1.02
Bryan	165	278	877	1,685	5,315	31.7	0.25
Caddo	281	(d)	(d)				
Canadian	272	739	6,282	2,717	23,096	11.8	1.84
Carter	328	673	2,292	2,052	6,988	29.4	0.67
Cherokee	8	9	23	1,125	2,875	39.1	0.01
Choctaw	111	179	509	1,613	4,586	35.2	0.15
Cimarron	(d)	(d)	(d)				
Cleveland	91	198	468	2,176	5,143	42.3	0.14
Coal	(d)	(d)	(d)				
Comanche	312	(d)	(d)				
Cottan	10	(d)	(d)				
Craig	37	55	211	1,486	5,703	26.1	0.06
Creek	1,314	2,999	7,133	2,282	5,428	42.0	2.09
Custer	289	490	1,466	1,695	5,073	33.4	0.43
Delaware	13	13	46	1,000	3,538	28.3	0.01
Dewey	7	7	45	1,000	6,429	15.6	0.01
Ellis	12	(d)	(d)				
Garfield	1,431	3,402	17,732	2,377	12,391	19.2	5.20
Garvin	195	458	1,454	2,349	7,456	31.5	0.43
Grady	352	679	1,760	1,929	5,000	38.6	0.52
Grant	77	(d)	(d)				
Greer	59	106	256	1,797	4,339	41.4	0.08
Harmon	51	(d)	(d)				
Harper	10	16	43	1,600	4,300	37.2	0.01

(continued on next page)

TABLE 11 (continued)

State and Counties	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Value Added in Each County as Per Cent of State Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Haskell	15	21	54	1,400	3,600	38.9	0.02
Hughes	70	109	239	1,557	3,414	45.6	0.07
Jackson	178	354	1,117	1,989	6,275	31.7	0.33
Jefferson	10	21	69	2,100	6,900	30.4	0.02
Johnston	15	19	49	1,267	3,267	38.8	0.01
Kay	3,289	9,122	24,612	2,773	7,483	37.1	7.22
Kingfisher	108	(d)	(d)				
Kiowa	85	166	442	1,953	5,200	37.6	0.13
Latimer	21	37	116	1,762	5,524	31.9	0.03
Le Flore	425	698	1,492	1,642	3,511	46.8	0.44
Lincoln	165	374	1,154	2,267	6,994	32.4	0.34
Logan	108	204	481	1,889	4,454	42.4	0.14
Love	(d)	(d)	(d)				
McClain	15	26	75	1,733	5,000	34.7	0.02
McCurtain	884	1,570	3,326	1,776	3,762	47.2	0.98
McIntosh	8	11	58	1,375	7,250	19.0	0.02
Major	99	(d)	(d)				
Marshall	(d)	(d)	(d)				
Mayes	60	72	177	1,200	2,950	40.7	0.05
Murray	62	102	245	1,645	3,952	41.6	0.07
Muskogee	1,333	2,305	7,638	1,729	5,730	30.2	2.24
Noble	22	39	117	1,773	5,318	33.3	0.03
Nowata	51	115	456	2,255	8,941	25.2	0.13
Okfuskee	90	125	323	1,389	3,589	38.7	0.09
Oklahoma	9,903	23,251	71,998	2,348	7,270	32.3	21.11
Okmulgee	2,038	5,458	13,743	2,678	6,743	39.7	4.03
Osage	356	947	4,137	2,660	11,621	22.9	1.21
Ottawa	1,436	(d)	(d)				
Pawnee	158	(d)	(d)				
Payne	619	1,651	6,268	2,667	10,126	26.3	1.84
Pittsburg	297	510	2,019	1,717	6,798	25.3	0.59
Pontotoc	895	1,877	7,119	2,097	7,954	26.4	2.09
Pottawatomie	578	1,119	3,012	1,936	5,211	37.2	0.88
Pushmataha	109	116	222	1,064	2,037	52.2	0.06
Roger Mills	4	5	14	1,250	3,500	35.7	...

(continued on next page)

TABLE 11 (continued)

State and Counties	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Value Added in Each County as Per Cent of State Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rogers	32	60	117	1,875	3,656	51.3	0.03
Seminole	183	256	775	1,399	4,235	33.0	0.23
Sequoyah	115	(d)	(d)				
Stephens	902	2,341	5,109	2,595	5,664	45.8	1.50
Texas	156	(d)	(d)				
Tillman	121	(d)	(d)				
Tulsa	11,527	29,565	96,462	2,565	8,368	30.6	28.28
Wagoner	68	78	274	1,147	4,029	28.5	0.08
Washington	1,106	2,701	6,544	2,442	5,917	41.3	1.92
Washita	29	49	242	1,690	8,345	20.2	0.07
Woods	144	275	672	1,910	4,667	40.9	0.20
Woodward	80	123	296	1,537	3,700	41.6	0.09

*Source: U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950), Table 2, pp. 495-496.

(d) Withheld to avoid disclosing figures for individual companies.

Components do not always add to total, because data for some firms were not shown separately, in order to avoid disclosure of data for individual companies.

TABLE 12

WAGES AND VALUE ADDED PER PRODUCTION WORKER IN MANUFACTURING IN OKLAHOMA, BY INDUSTRY, 1947*

Industry	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added
(1)	(2)	(3)	(4)	(5)	(6)	(7)
All Industries, Total	44,302	105,277	341,027	2,376	7,698	30.9
Food and kindred products	10,966	22,654	75,969	2,066	6,928	29.8
Meat products	3,332	7,513	16,601	2,255	4,982	45.2
Meat packing, wholesale	2,874	6,717	14,297	2,337	4,975	47.0
Prepared meats	139	307	1,205	2,209	8,669	25.5
Poultry dressing, wholesale	319	489	1,099	1,533	3,445	44.5
Dairy products	898	1,615	5,159	1,798	5,745	31.3
Creamery butter	419	703	2,395	1,678	5,716	29.4
Natural cheese	155	296	967	1,910	6,239	30.6
Canning, preserving, and freezing	436	488	1,488	1,119	3,413	32.8
Grain-mill products	1,976	4,910	23,473	2,485	11,879	20.9
Bakery products	1,796	3,643	11,378	2,028	6,335	32.0
Confectionery products	303	527	1,347	1,739	4,446	39.1
Beverages	690	1,279	6,533	1,854	9,468	19.6
Miscellaneous food preparations	1,535	2,679	9,990	1,745	6,508	26.8
Manufactured ice	867	1,563	5,523	1,803	6,370	28.3
Liquid, frozen, and dried eggs	345	499	1,009	1,446	2,925	49.4
Textile mill products	(d)	(d)	(d)			
Apparel and related products	773	1,012	2,466	1,309	3,190	41.0
Men's and boys' furnishings	468	585	1,272	1,250	2,718	46.0
Miscellaneous fabricated textiles	178	282	877	1,584	4,927	32.2
Canvas products	91	140	417	1,538	4,582	33.6
Lumber and products, except furniture	2,075	3,713	8,135	1,789	3,920	45.6
Sawmills and planing mills, general	510	803	1,491	1,575	2,924	53.8
Millwork and related products	915	1,854	4,091	2,026	4,471	45.3
Millwork plants	781	1,539	3,406	1,971	4,361	45.2
Prefabricated wood products	134	315	685	2,351	5,112	46.0
Wood products, n.e.c.	114	152	455	1,333	3,991	33.4

(continued on next page)

TABLE 12 (continued)

Industry	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Furniture and fixtures	1,064	2,068	4,339	1,944	4,078	47.7
Household furniture	609	1,004	1,478	1,649	2,427	67.9
Mattresses and bedsprings	121	250	475	2,066	3,926	52.6
Screens, shades, and blinds	315	702	2,470	2,229	7,841	28.4
Paper and allied products	268	591	1,994	2,205	7,440	29.6
Printing and publishing industries	3,057	7,369	27,542	2,411	9,009	26.8
Newspapers	1,686	4,205	17,161	2,494	10,179	24.5
Periodicals	78	275	1,698	3,526	21,769	16.2
Books	77	194	1,059	2,519	13,753	18.3
Commercial printing	824	1,841	4,399	2,234	5,339	41.8
Lithographing	211	364	1,534	1,725	7,070	23.7
Printing trade service industries	83	273	791	3,289	9,530	34.5
Chemicals and allied products	1,207	2,806	12,127	2,325	10,047	23.1
Vegetable and animal oils	702	1,417	5,283	2,019	7,526	26.8
Cottonseed oil mills	508	1,027	3,998	2,022	7,870	25.7
Miscellaneous chemical products	210	586	2,705	2,790	12,881	21.7
Petroleum and coal products	6,352	19,340	79,875	3,045	12,575	24.2
Petroleum refining	6,134	18,860	77,572	3,075	12,646	24.3
Paving and roofing materials	122	288	1,054	2,361	8,639	27.3
Lubricants, n.e.c.	87	169	1,110	1,943	12,759	15.2
Rubber products	1,063	(d)	(d)			
Leather and leather products	15	19	44	1,267	2,933	43.2
Stone, clay, and glass products	3,956	9,126	23,411	2,307	5,918	39.0
Pressed and blown glassware	1,566	3,476	7,924	2,220	5,060	43.9
Brick and hollow tile	380	694	1,476	1,826	3,884	47.0
Concrete and plaster products	743	1,487	5,008	2,001	6,740	29.7
Primary metal industries	3,103	7,498	16,442	2,416	5,299	45.6
Iron and steel foundries	631	1,162	3,011	1,842	4,772	38.6
Primary zinc	2,055	5,246	11,311	2,553	5,504	46.4

(continued on next page)

TABLE 12 (continued)

Industry	Number of Production Workers	Wages of Production Workers (thousands of dollars)	Value Added by All Employees (thousands of dollars)	Average Annual Wage Per Production Worker (dollars)	Average Annual Value Added Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fabricated metal products	2,722	6,338	18,862	2,328	6,929	33.6
Structural metal products	2,265	5,313	16,248	2,346	7,174	32.7
Structural and ornamental products	988	2,286	7,228	2,314	7,316	31.6
Boiler shop products	1,154	2,770	8,548	2,400	7,407	32.4
Sheet metal works	123	257	472	2,089	3,837	54.4
Machinery (except electrical)	4,906	12,869	37,134	2,623	7,569	34.6
Construction and mining machinery	3,019	8,302	24,641	2,750	8,162	33.7
General industrial machinery	890	2,198	5,919	2,470	6,651	37.1
Pumps and compressors	526	1,177	3,663	2,238	6,964	32.1
Conveyors	205	541	1,161	2,639	5,663	46.6
General industrial machinery, n.e.c.	107	377	951	3,523	8,888	39.6
Service and household machines	205	515	1,341	2,512	6,541	38.4
Miscellaneous machinery parts	484	1,172	3,456	2,421	7,140	33.9
Machine shops	131	291	659	2,221	5,031	44.2
Electrical machinery	(d)	(d)	(d)			
Transportation equipment	1,034	2,444	5,556	2,364	5,373	44.0
Truck and bus bodies	352	991	2,145	2,815	6,094	40.2
Instruments and related products	341	(d)	(d)			
Miscellaneous manufactures	270	571	1,096	2,115	4,059	52.1
Miscellaneous manufactures	194	444	857	2,289	4,418	51.8
Signs and advertising displays	90	247	465	2,744	5,167	53.1

*Source: U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. III, Statistics by States, (Washington: U. S. Government Printing Office, 1950), Table 4, pp. 497-498.

n.e.c. Indicates not elsewhere classified.

(d) Withheld to avoid disclosing figures for individual companies.

Components do not always add to total, because data for some firms were not shown separately, in order to avoid disclosure of data for individual companies.

TABLE 13

AVERAGE HOURLY WAGE PER PRODUCTION WORKER IN THE UNITED STATES AND OKLAHOMA, SELECTED MANUFACTURING INDUSTRIES, 1947*

Industry	Average Hourly Wage Per Production Worker (dollars)	
	United States	Oklahoma
(1)	(2)	(3)
All Industries, Total	1.24	1.11
Food and kindred products		
Meat packing, wholesale	1.25	1.04
Prepared meats	1.17	0.96
Poultry dressing, wholesale	0.75	0.78
Creamery butter	0.90	0.74
Creamery butter and field milk	0.94	0.78
Natural cheese	0.92	0.79
Concentrated and fluid milk	1.11	0.78
Ice cream, ices, and fluid milk	1.03	0.74
Bakeries selling primary to grocers	1.06	0.94
Retail multi-outlet bakeries	1.08	0.88
Confectionery products	0.94	0.87
Manufactured ice	0.89	0.75
Liquid, frozen, and dried eggs	0.77	0.67
Apparel and related products		
Canvas products	0.98	0.76
Lumber and products		
Sawmills and planing mills	0.99	0.75
Millwork plants	1.10	0.86
Prefabricated wood products	1.20	1.10
Furniture and fixtures		
Mattresses and bedsprings	1.18	0.88
Printing and publishing		
Newspapers	1.62	1.26
Periodicals	1.54	1.59
Commercial printing	1.40	1.08
Lithographing	1.49	0.84

(continued on next page)

TABLE 13 (continued)

Industry	Average Hourly Wage Per Production Worker (dollars)	
	United States	Oklahoma
(1)	(2)	(3)
Chemicals and allied products		
Cottonseed oil mills	0.73	0.69
Petroleum and coal products		
Petroleum refining	1.67	1.49
Lubricants, n.e.c.	1.26	0.90
Stone, clay, and glass products		
Brick and hollow tiles	1.02	0.85
Primary metal industries		
Primary zinc	1.37	1.29
Fabricated metal products		
Structural and ornamental products	1.32	1.14
Boiler shop products	1.37	1.10
Sheet metal works	1.36	1.07
Machinery (except electrical)		
Pumps and compressors	1.35	1.15
Conveyors	1.45	1.15
General industrial machinery,n.e.c.	1.38	1.42
Machine shops	1.26	1.07
Transportation equipment		
Truck and bus bodies	1.33	1.40
Miscellaneous manufactures		
Signs and advertising displays	1.25	1.32

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. II and III, (Washington: U. S. Government Printing Office, 1950).

n.e.c. Indicates not elsewhere classified.

are also few in number. Petroleum is by far the most important and, together with food manufacturing, accounts for almost half the total in the states. (Table 12). Other relatively important types of manufacturing are machinery, printing and publishing, and stone, clay, and glass. These five account for about three-fourths of the state's total manufacturing activity. Of somewhat lesser importance are the manufacture of fabricated metal products, primary metal industries, chemicals and allied products, lumber and products, and transportation equipment.

Average hourly wage rates paid in manufacturing industries in Oklahoma are generally below the national average. (Table 13). For all manufacturing industries the Oklahoma rate is 12 per cent below the national average. This generalization applies to all major manufacturing industry groups, but in some of the subclassifications hourly wage rates are slightly above those for the nation. Average hourly wage rates are slightly above the national average in wholesale poultry dressing, the printing and publishing of periodicals, the manufacturing of general industrial machinery, the manufacturing of truck and bus bodies, and in the manufacture of signs and advertising displays. In 1947 these five industries accounted for less than 2 per cent of the value added by manufacturing in all Oklahoma industries. Put in slightly different terms, in the

industries which account for more than 98 per cent of value added by manufacturing in Oklahoma, average hourly wage rates were below the national average.

CHAPTER IV

PETROLEUM MANUFACTURING IN OKLAHOMA

Development of Petroleum in Oklahoma

Petroleum is the most important manufacturing industry in Oklahoma. Although petroleum and coal products are grouped together as a single major industry group in the classification of the Bureau of the Census, coal is not an important manufacturing economic activity in Oklahoma. In 1951 the value of coal was merely 2.2 per cent of the total value of minerals produced in Oklahoma, whereas the value of crude petroleum accounted for about 79 per cent of all the mineral value in the state.[1]

The vital role of petroleum products in the modern industrial age is exceedingly important. Gasoline, a major product of petroleum, is widely used in transportation for propelling automobiles, airplanes, and other vehicles that have become indispensable in the function of any modern economy. During the last 50 years petroleum products have

---

[1] U. S. Bureau of Mines, Mineral Yearbook, 1951, (Washington: U. S. Government Printing Office, 1954), Table 45, 65.

replaced coal because petroleum is comparatively less bulky and easier to handle. Petroleum lubricants have made the automotive machinery highly efficient, and its use in the industry is of utmost necessity. Petroleum products also are used extensively in the manufacture of synthetic rubber and other products.

In Oklahoma the first commercial oil well was discovered in 1897 at Bartlesville.[2] Rapid development did not occur in petroleum production at that time owing to the lack of transportation in Oklahoma. In 1903 a pipeline was set up between Kansas and Oklahoma which stimulated petroleum production in Oklahoma. In 1905 a few oil fields were discovered near Tulsa that made the people of Oklahoma considerably more oil conscious. Local companies took an unprecedented interest in the oil business; and in 1907, Oklahoma produced approximately 43.5 million barrels of crude oil. In 1912 efficient oil wells were drilled at Cushing, and their output by May, 1915 stood at 310,000 barrels a day. Output from these oil fields was so large that during the first seven years of their operation they accounted for 17 per cent of all oil marketed in the United States. Between 1912 and 1914 crude oil production in Oklahoma increased by 50 per

---

[2] Clyde E. Hamm, "Petroleum Plays Big Role in Oklahoma's Economy," World Oil (February 1, 1952), 40-46.

cent. Oklahoma's output of 74 million barrels in the latter year accounted for 35 per cent of the nation's total production.[3] In 1927 Oklahoma led the nation with a production of 278 million barrels, but in 1928 Texas took first place and has held it ever since. In 1953 Oklahoma held fourth position in the nation in crude petroleum production, surpassed only by Texas, California, and Louisiana.[4]

In 1951 value at well of crude petroleum in Oklahoma was $483 million, or 8.5 per cent of the nation's total value of about $5,682 million.[5] In earlier years Oklahoma used to export its crude oil to the eastern states for refining, but recently a number of refineries have been established in the state. In 1947 petroleum refining in Oklahoma accounted for about 97 per cent of the total state manufacturing of petroleum and coal products.

In 1951 Oklahoma produced 55.3 million barrels of gasoline, of which only 17.7 million barrels were consumed within the state. In other words, only 32 per cent of all the gasoline produced in Oklahoma was consumed within the state and the rest exported to other states.[6]

---

[3] Ibid., 44-46.

[4] "U. S. Crude Oil Production," World Oil (February 15, 1954), 149-150.

[5] Mineral Yearbook, 1951, op. cit., Table 45, 989.

[6] Ibid., 1011.

In mineral production Oklahoma ranks sixth in the nation, exceeded only by Texas, Pennsylvania, California, West Virginia, and Louisiana.[7] In 1951 total value of minerals in Oklahoma was $607 million, of which the value of crude petroleum accounted for $480 million while the value of coal was $14 million. Petroleum and coal combined accounted for about 81 per cent of all mineral value in Oklahoma, while petroleum alone accounted for 79 per cent.[8]

Thus, it is evident that petroleum is the most important manufacturing as well as mining activity in Oklahoma, and other mining activities are relatively small. It is apparent, therefore, that if figures for petroleum are excluded from mining, Oklahoma will rank very low among the mining states in the nation.

Petroleum in Oklahoma Compared with the United States

Introduction

On the basis of value added petroleum is the most important manufacturing industry in Oklahoma.[9] Among all the

---

[7] Ibid., 42-43.

[8] Ibid., 65.

[9] The discussion on petroleum as well as other manufacturing industries in the succeeding chapters pertains primarily to the data obtained from the Census of Manufactures: 1947.

industries of the state only food exceeds petroleum in total number of employees and production workers, total wages and salaries of all employees, and wages and man-hours of production workers. Total value added in petroleum alone accounts for about one-fourth of the total value added in all manufacturing industries in the state. If value added in petroleum is excluded, average annual value added per employee and per production worker is considerably reduced.

In this discussion petroleum manufacturing in Oklahoma is compared with the nation, with the neighboring states, with the five highest states selected on the basis of value added, and with states where petroleum manufacturing is about as important as in Oklahoma. Since petroleum is Oklahoma's big manufacturing industry on the basis of value added and wages paid to production workers, the analysis will indicate Oklahoma's standing relative to other states.

Although total value added is high for petroleum in Oklahoma the number of establishments manufacturing petroleum products is relatively small. In 1947 there were only 40 petroleum manufacturing establishments in Oklahoma, or about 2.3 per cent of the total number of establishments in all manufacturing industries in the state. Food, plus printing and publishing, account for nearly 59 per cent of the total number of establishments in Oklahoma. In petroleum the size of establishment is relatively larger than in other manu-

facturing industries in the state. In food only 2 per cent of the establishments have 100 or more employees as contrasted with about 38 per cent in petroleum in Oklahoma.

With the possible exception of food, petroleum has more employees than any other manufacturing industry in Oklahoma. In 1947 total employees in petroleum manufacturing accounted for roughly 14 per cent of the state total. Approximately the same pattern exists for the number of production workers in the state. Total value added in petroleum is more than each of the other manufacturing industries. Since value added in petroleum is about one-quarter of the state total, the exclusion of petroleum would result in a considerable amount of reduction in the total value added in Oklahoma. Similarly wages and salaries of all employees in petroleum for Oklahoma account for about 16 per cent of the total wages and salaries of all employees in the state. Total wages of production workers reflect a similar situation. Likewise, the number of man-hours for production workers in petroleum is about 14 per cent of the total man-hours for all manufacturing industries in Oklahoma.

Although petroleum is an important manufacturing industry in Oklahoma, the total value added in the petroleum industry is higher in several other states. Oklahoma ranks 9th in the nation with respect to the amount of value added in petroleum. The number of establishments for petroleum

in Oklahoma is less than one-tenth of 1 per cent of the total number of establishments for petroleum in the nation. Food, which has the largest number of establishments in Oklahoma, accounts for about 0.3 per cent of the national total; and printing and publishing about 0.2 per cent. Each of the remaining manufacturing industries in Oklahoma account for less than one-tenth of 1 per cent of the nation's number of establishments in their respective industries.

Oklahoma's total number of employees in petroleum is about 4 per cent of the nation's total. The same proportion is prevalent for the number of production workers. Total employees in Oklahoma for all manufacturing industries are about 0.4 per cent of the total number of employees in all manufacturing industries in the United States. The number of production workers bear the same relationship with the nation. Petroleum, being the most important manufacturing industry in Oklahoma, accounts for about 4 per cent of the total value added in petroleum for the nation, although total value added in all manufacturing industries in Oklahoma is about one-half of 1 per cent of the national total for all manufacturing industries. Similarly total wages and salaries of all employees and wages and man-hours of production workers in petroleum for Oklahoma account for about 4 per cent of the nation's total in petroleum; whereas total production workers, wages and salaries, and man-hours

of production workers in all manufacturing industries in Oklahoma are only 0.3 per cent of the nation's total.

Number of Employees and Production Workers

As stated above the number of employees for petroleum in Oklahoma accounts for about 0.4 per cent of the total number of employees in petroleum in the United States. Oklahoma has about 7,500 employees in petroleum as against 212,000 in the United States. Approximately the same situation is evident with respect to the number of production workers in petroleum for Oklahoma as contrasted with the national total. In Oklahoma production workers are about 85 per cent of all employees in petroleum as against 80 per cent in the nation. (Table 14).

Value Added by Manufacture

Value added in petroleum in Oklahoma is about 4 per cent of the total value added in the United States. For Oklahoma the total amount of value added in petroleum is about $80 million as against approximately $2,105 million in the nation. (Table 15). Average annual value added per production worker in petroleum for Oklahoma is relatively higher than the national average by about 6 per cent.

TABLE 14

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN PETROLEUM MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
Oklahoma	7,489	6,352	23,477	19,340	84.8	82.4
United States	212,003	169,610	739,345	556,365	80.0	75.2
GROUP A[1]						
Texas	37,696	29,662	139,040	105,908	78.7	76.2
Kansas	4,549	3,554	14,829	11,154	78.1	75.2
Arkansas	1,193	914	3,454	2,570	76.6	74.4
Missouri	2,509	2,012	8,028	6,063	80.2	75.5
Colorado	791	693	2,844	2,391	87.6	84.1
GROUP B[2]						
Texas	37,696	29,662	139,040	105,908	78.7	76.2
Pennsylvania	29,325	23,314	100,411	74,992	79.5	74.7
California	21,472	17,227	74,990	56,994	80.2	76.0
New Jersey	16,191	13,307	60,303	47,813	82.2	79.3
Illinois	17,051	13,614	57,511	43,582	79.8	75.8
GROUP C[3]						
Indiana	16,500	13,164	59,605	45,542	79.8	76.4
Ohio	10,959	9,096	36,686	28,477	83.0	77.6
New York	7,576	6,433	25,304	20,418	84.9	80.7
Kansas	4,549	3,554	14,829	11,154	78.1	75.2
Michigan	3,479	2,851	12,323	9,224	81.9	74.8

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 15

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN PETROLEUM MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	79,875	12,575	3,045	24.2	1.48	3.96
United States	2,015,307	11,882	3,280	27.6	1.57	
GROUP A[1]						
Texas	359,680	12,126	3,570	29.4	1.75	17.85
Kansas	51,118	14,383	3,138	21.8	1.25	2.54
Arkansas	17,064	18,670	2,812	15.1	1.31	0.85
Missouri	14,860	7,386	3,013	40.8	1.49	0.74
Colorado	9,607	13,663	3,450	24.9	1.69	0.48
GROUP B[2]						
Texas	359,680	12,126	3,570	29.4	1.75	17.85
Pennsylvania	243,190	10,431	3,217	30.8	1.59	12.07
California	213,503	12,394	3,308	26.7	1.55	10.59
New Jersey	212,807	15,992	3,593	22.5	1.63	10.56
Illinois	162,137	11,910	3,201	26.9	1.52	8.04
GROUP C[3]						
Indiana	113,371	8,612	3,460	40.2	1.73	5.62
Ohio	95,811	10,533	3,131	29.7	1.46	4.75
New York	59,594	9,264	3,174	34.3	1.54	2.96
Kansas	51,118	14,383	3,138	21.8	1.25	2.54
Michigan	50,247	17,624	3,235	18.4	1.50	2.49

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

Wages and Salaries of All Employees, and Wages of Production Workers

In petroleum wages and salaries of employees in Oklahoma are about 0.4 per cent of the United States wages and salaries in this manufacturing industry. Oklahoma has about $23 million of wages and salaries as compared with about $739 million in the nation. In Oklahoma wages of production workers are about 82 per cent of all wages and salaries in petroleum compared with 75 per cent for the nation. Since wages and salaries of all employees are more than the wages of production workers, wages and salaries of all employees as a per cent of value added are higher than the wages of production workers as a per cent of value added. In petroleum wages of production workers are about 24 per cent of the value added, but the wages and salaries of all employees account for approximately 29 per cent of the value added in Oklahoma. Similarly in the United States production wages are about 28 per cent of value added as against 37 per cent for total wages and salaries.

Although the average annual value added per production worker in petroleum in Oklahoma was higher than the national average, the average annual wage per production worker is lower than the United States average. In Oklahoma the average annual wage per production worker in petroleum was $3,045, as contrasted with a national average of $3,280.

Thus, a production worker's average annual wage in petroleum for Oklahoma is about 8 per cent lower than the national average. Relative to other major manufacturing industries in the state, Oklahoma pays the highest average hourly wage in petroleum; but Oklahoma's hourly wage in petroleum is about 8 per cent below the national average.[10]

Petroleum in Oklahoma and the Surrounding States (Group A)

This section includes a discussion on petroleum manufacturing in Oklahoma compared with the surrounding states, Texas, Missouri, Kansas, Colorado, and Arkansas. New Mexico, which appears in most of the manufacturing industries as one of the surrounding states, reports no statistics for petroleum and is left out of the analysis.

Number of Employees and Production Workers

With the exception of Texas, Oklahoma's total number of employees (and number of production workers) in petroleum is greater than each of the neighboring states. In Oklahoma, as well as in all the surrounding states, production workers in petroleum are between 77 per cent to 88 per cent of the total number of employees.

---

[10] In the printing and publishing of periodicals, relatively unimportant in Oklahoma, the average hourly wage rate was slightly above that in petroleum manufacturing.

Value Added by Manufacture

As in the case of total employees, value added in petroleum in Oklahoma is less than in Texas but considerably greater than in each of the remaining surrounding states. Total value added in petroleum in Oklahoma is almost twice the total for Kansas, and substantially more than for Missouri, Colorado, or Arkansas. Oklahoma accounts for about 4 per cent of the total value added in petroleum in the United States, as contrasted with about 18 per cent for Texas. Each of the other surrounding states account for less than 2 per cent of the national total. The average annual value added per production worker in Oklahoma is about $12,575, which is less than in Kansas, Colorado, or Arkansas but slightly more than in Texas or Missouri. (Table 15)

Wages and Salaries of All Employees, and Wages of Production Workers

Total wages and salaries in petroleum in Oklahoma are below Texas, but above each of the other surrounding states. Oklahoma's total is equal to about one-sixth of the total amount of wages and salaries in Texas, about one-half times larger than in Kansas, and substantially larger than in Missouri, Colorado, or Arkansas. Total production workers in petroleum for Oklahoma stand in the same relationship with the surrounding states. Total wages of production workers in petroleum in Oklahoma and other states in this

group are between 74 per cent and 84 per cent of total wages and salaries of all employees. Oklahoma's total wages are about 24 per cent of the total value added in petroleum as compared with figures in the surrounding states ranging from 15 per cent in Arkansas to 41 per cent in Missouri.

In Oklahoma the average annual wage per production worker was more than in Missouri or Arkansas, but less than in Texas, Kansas, or Colorado. A production worker in petroleum in Oklahoma received an average annual wage of less than Texas by about 17 per cent, less than Colorado by 11 per cent, and less than Kansas by 3 per cent; on the other hand, more than Missouri and Arkansas by 1 per cent and 8 per cent respectively. A similar pattern existed for average annual wage per production worker calculated on the basis of 2,000 man-hours. Likewise hourly wages of production workers in petroleum for Oklahoma showed the same characteristics in comparison with the surrounding states. A production worker in Oklahoma received an hourly wage of $1.48 in petroleum, which was less than Texas and Colorado but greater than Missouri, Kansas and Arkansas. In petroleum Oklahoma's average hourly wage was less than Texas and Colorado by about 18 per cent and 14 per cent respectively. On the other hand, Oklahoma's production worker in petroleum received an hourly wage 10 per cent above that in Kansas and 15 per cent higher than in Arkansas. Missouri's production worker received an

hourly wage about the same as in Oklahoma. Oklahoma's hourly wage was lower than the weighted hourly wage for the surrounding states by almost 10 per cent.

Man-hours of Production Workers

Total man-hours of production workers in petroleum were about 13 millions in Oklahoma, slightly less than one-fifth of Texas and more than each of the neighboring states. The total man-hours of production workers follow the same pattern as the total number of production workers.

Petroleum In Oklahoma Compared with the Five Highest States (Group B)

In petroleum manufacturing the five highest states (on the basis of value added) are Texas, Pennsylvania, California, New Jersey, and Illinois. Since Oklahoma is an important state in petroleum manufacturing this analysis will reflect the position of Oklahoma relative to these states which are predominant in petroleum manufacturing.

Number of Employees and Production Workers

In Oklahoma the total number of employees in petroleum was about 7,000 in 1947, considerably less than in each of the five highest states. The total number of employees in the five highest states for petroleum ranged from 17,000 in Illinois to 38,000 in Texas. Roughly the same is true of the number of production workers relative to these states. In

petroleum manufacturing, production workers in Oklahoma were about 85 per cent of all employees, which was higher than in each of the five highest states.

Value Added by Manufacture

Total value added in petroleum in Oklahoma was substantially below each of the five highest states. Oklahoma accounts for about 4 per cent of the total value added in petroleum in the nation, whereas total value added among the five highest states varied from 8 per cent in Illinois to 18 per cent in Texas. With the exception of New Jersey, average annual value added per production worker in petroleum in Oklahoma was higher than in each of these states.

Wages and Salaries of All Employees, and Wages of Production Workers

Oklahoma's total wages and salaries in petroleum accounted for $23 million, about one-third of that in Illinois and one-sixth of that in Texas. In the same way, production workers in Oklahoma bear the same proportion when compared with the five highest states. Total wages of production workers in Oklahoma were about 82 per cent of total wages and salaries of all employees in petroleum, which was relatively higher than in each of the Group B states. Furthermore, total wages in Oklahoma accounted for about 24 per cent of total value added, which was more than in New Jersey

by 2 percentage points, but less than in each of the remaining five highest states. The same is true of wages and salaries of all employees as a percent of total value added.

Although average annual value added per production worker in petroleum in Oklahoma was greater than in all but one of the five highest states, average annual wages of production workers were lower than in any of these states. A production worker in Oklahoma received an average annual wage 17 per cent less than in Texas, 6 per cent less than in Pennsylvania, 9 per cent less than in California, 18 per cent less than in New Jersey, and 5 per cent less than in Illinois. The same situation prevails in the case of average annual wage computed on the basis of 2,000 man-hours. As in the case of average annual wage, the average hourly wage per production worker in petroleum for Oklahoma was lower than in each of the Group B states. A production worker in Oklahoma received an hourly wage of $1.48, which was about 18 per cent less than in Texas, 8 per cent less than in Pennsylvania, 6 per cent less than in California, 10 per cent less than in New Jersey, and 3 per cent less than in Illinois. Oklahoma's wage was also less than the weighted hourly wage of all these states.

Petroleum in Oklahoma and Group C States

Oklahoma may now be compared with those states in which value added in petroleum is about as important as in Oklahoma.

Such states are Indiana, Kansas, Michigan, New York, and Ohio, each with 50 per cent of value added above or below Oklahoma. (Group C). Most of these states are industrially more developed.

Number of Employees and Production Workers

In Oklahoma the total number of employees in petroleum is less than in Indiana and Ohio, about the same as in New York, and more than in Kansas and Michigan. The number of production workers Oklahoma shows a similar relationship with these states. Production workers as a per cent of total employees in petroleum in Oklahoma are similar when compared with the states of Group C.

Value Added by Manufacture

Oklahoma's total value added in petroleum was less than Indiana and Ohio, but more than the remaining states in this category. Consequently, total value added in Oklahoma as a per cent of the national total was also less than Indiana and Ohio, but more than in Kansas, Michigan, and New York. Average annual value added per production worker in Oklahoma was greater than in Indiana, New York, and Ohio, but less than in Kansas and Michigan. The same is true of average annual value added per employee.

Wages and Salaries of All Employees, and Wages of Production Workers

In petroleum total wages and salaries of all employees in Oklahoma amounted to $23 million, more than in Kansas and Michigan, and less than in Indiana, New York, and Ohio. A similar relationship existed for wages of production workers. Wages of production workers in Oklahoma were a slightly higher percentage of total wages and salaries than in each of the states in this group. In petroleum total wages of production workers in Oklahoma were about 24 per cent of value added as contrasted with 40 per cent in Indiana, 34 per cent in New York, and 30 per cent in Ohio. Kansas and Michigan had a percentage similar to Oklahoma.

Oklahoma's average annual wage per production worker in petroleum was lower than in each of the Group C states. A production worker in petroleum in Oklahoma received an annual wage about 14 per cent less than in Indiana, 3 per cent less than in Kansas, 6 per cent less than in Michigan, 4 per cent less than in New York, and 3 per cent less than in Ohio. The average annual wage of production workers on the basis of 2,000 man-hours was lower than in each of these states. The hourly wage of production workers in Oklahoma was also lower than most of these states. Finally, Oklahoma's average hourly wage in petroleum was less than the weighted hourly average wage for the states of this group.

Man-hours of Production Workers

Total man-hours of production workers in petroleum in Oklahoma were less than in Indiana and Ohio, about equal to those in New York, and more than in Kansas and Michigan. Total man-hours worked generally correspond with the total number of production worker in all manufacturing industries.

Summary of the Chapter

Petroleum is the most important manufacturing industry in Oklahoma. In general Oklahoma rates fairly high in comparison with most of the states in the nation. Oklahoma's 9th rank in total value added in petroleum manufacturing indicates that this economic activity is of great significance. Since petroleum alone accounts for about one-quarter of the total value added by all manufacturing industries in the state, its exclusion would result in a substantial decrease in the total amount of value added.

Oklahoma employs about 6,000 production workers in petroleum. The exclusion of this manufacturing industry from the total would cause a drop of about 16 per cent in the total number of production workers in all manufacturing. Similarly, if petroleum is left out, the total amount of value added shows a decrease of about 30 per cent. Likewise, the wages of production workers are decreased by about 22 per cent if petroleum is excluded.

Compared with the United States average, petroleum showed a higher per production worker value added in Oklahoma, but average wages are lower. This is true of a comparison with the Broup B states too. In general, petroleum manufacturing in Oklahoma shows a development similar to the surrounding states and Group C states. The higher annual and hourly wages in most of the other states may be due to the fact that industrial growth in these areas has been more rapid. Although in total value added Oklahoma is not one of the highest states in petroleum manufacturing, it is the most important manufacturing industry in the state.

CHAPTER V

FOOD MANUFACTURING IN OKLAHOMA

The purpose of this chapter is to compare food manufacturing in Oklahoma on the basis of value added with the national average, with neighboring states, with the five states in which food manufacturing is most important, and with states where food manufacturing is about as important as in Oklahoma. Since food manufacturing is Oklahoma's second most important manufacturing industry, exceeded only by petroleum, the analysis will indicate Oklahoma's standing relative to other states and the average for the nation.

On the basis of value added in all manufacturing industries, Oklahoma ranks 32nd in the nation, and in food manufacturing Oklahoma ranks 27th. The total number of employees in food manufacturing in Oklahoma accounts for about 1 per cent of total employees in food manufacturing in the United States. Production workers in food manufacturing in Oklahoma are slightly less than 1 per cent of the total production workers engaged in food manufacturing in the United States. Total value added in food manufacturing in Oklahoma is about 0.8 per cent of total value added in food manufac-

turing in the United States. Total wages paid production workers in food manufacturing in Oklahoma account for nearly 0.8 per cent of total wages of production workers in food manufacturing in the United States.

Food manufacturing in Oklahoma accounts for only a small part of the national total, but it is an important manufacturing industry within the state. Food manufacturing accounts for about 26 per cent of all employees in manufacturing in Oklahoma, and about 20 per cent of production workers in all manufacturing. The number of production workers in food manufacturing is greater than in any other manufacturing industry in the state, even greater than in petroleum. Value added in food manufacturing is almost 22 per cent of total value added in all manufacturing in the state. Wages of production workers in this industry account for 21 per cent of total production worker wages in all manufacturing in the state. Thus, while food manufacturing accounts for somewhat less than 1 per cent of the national total, it is very important relative to other manufacturing industries in the state. Food manufacturing employs about 4,000 more workers than petroleum manufacturing, while wages of production workers in food manufacturing were about $3 million larger in 1947.

Food manufacturing also has the largest number of establishments among all manufacturing industries in the

state. This industry accounts for 643 (37 per cent) of the state total of 1,740 establishments. Most of these establishments are relatively small. Two out of three have fewer than 20 employees each, and only about a dozen establishments employ 100 or more each.

Food Manufacturing in Oklahoma Compared with the United States

Number of Employees and Production Workers

The total number of employees and the number of production workers in food manufacturing in Oklahoma account for about 1 per cent of the national total. (See Table 16). In 1947 there were 14,500 employees in Oklahoma, compared with 1.4 million in the United States. There were 11,000 production workers in food manufacturing in Oklahoma and 1.1 million in the nation. Production workers were about the same percentage (75) of all employees in food manufacturing in Oklahoma as in the United States.

Value Added by Manufacture

With the exception of petroleum, value added in food manufacturing in Oklahoma is the highest of any manufacturing industry in the state. Total value added in 1947 amounted to $76 million, compared with the national total of slightly more than $9 billion. (Table 17). Average annual value added per production worker in Oklahoma was $6,928, about

TABLE 16

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN FOOD MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	14,487	10,966	34,137	22,654	75.7	66.4
United States	1,441,847	1,099,478	3,789,387	2,572,190	76.2	67.9
GROUP A[1]						
Texas	57,784	42,817	130,543	82,484	74.1	63.2
Missouri	50,803	38,891	137,089	95,860	76.6	70.0
Kansas	27,614	21,735	73,849	53,994	78.7	73.1
Colorado	15,295	12,160	39,195	28,282	79.5	72.2
Arkansas	9,719	7,527	16,760	10,643	77.4	63.5
New Mexico	1,706	1,289	3,497	2,334	75.6	66.7
GROUP B[2]						
Illinois	138,937	106,571	408,468	284,513	76.7	69.6
New York	135,296	100,518	397,675	259,987	74.3	65.4
California	120,510	94,942	355,586	252,202	78.8	70.9
Pennsylvania	103,370	78,396	264,108	174,045	75.8	65.9
Ohio	67,003	48,142	179,833	112,705	71.8	62.7
GROUP C[3]						
Oregon	17,761	14,538	46,063	34,211	81.8	74.3
Colorado	15,295	12,160	39,195	28,282	79.5	72.2
Florida	19,565	14,463	42,976	27,560	73.9	64.1
Virginia	21,555	16,434	42,800	25,684	76.2	60.0
North Carolina	16,716	11,574	34,973	19,204	69.2	54.9
Alabama	11,920	8,368	24,127	14,487	70.2	60.1
Connecticut	8,206	5,439	22,833	13,197	66.3	57.8
Idaho	6,020	4,944	14,951	11,572	82.1	77.4
Utah	8,036	6,533	18,530	13,320	81.3	71.9
Maine	8,658	7,313	16,891	12,900	84.5	76.4
Arkansas	9,719	7,527	16,760	10,643	77.4	63.5

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 17

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN FOOD MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	75,969	6,928	2,066	29.8	0.92	0.84
United States	9,024,912	8,208	2,339	28.5	1.09	
GROUP A[1]						
Texas	337,558	7,884	1,926	24.4	0.87	3.74
Missouri	331,753	8,530	2,465	28.9	1.12	3.68
Kansas	151,922	6,990	2,484	35.5	1.11	1.68
Colorado	92,675	7,621	2,326	30.5	1.06	1.03
Arkansas	41,020	5,450	1,414	25.9	0.68	0.45
New Mexico	7,898	6,127	1,811	29.6	0.80	0.09
GROUP B[2]						
Illinois	1,010,268	9,480	2,670	28.2	1.23	11.19
New York	977,329	9,723	2,586	26.6	1.19	10.83
California	851,836	8,972	2,656	29.6	1.30	9.44
Pennsylvania	586,025	7,475	2,220	29.7	1.04	6.49
Ohio	413,216	8,583	2,341	27.3	1.08	4.58
GROUP C[3]						
Oregon	107,767	7,413	2,353	31.7	1.16	1.19
Colorado	92,675	7,621	2,326	30.5	1.06	1.03
Florida	92,324	6,383	1,906	29.8	0.86	1.02
Virginia	88,388	5,378	1,563	29.0	0.78	0.98
North Carolina	78,430	6,776	1,660	24.5	0.76	0.87
Alabama	55,160	6,592	1,731	26.3	0.79	0.61
Connecticut	48,548	8,926	2,426	27.2	1.08	0.54
Idaho	43,653	8,829	2,341	26.5	0.99	0.48
Utah	42,948	6,574	2,039	31.0	1.02	0.48
Maine	42,409	5,799	1,764	30.4	0.86	0.47
Arkansas	41,020	5,450	1,414	25.9	0.68	0.45

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1]States surrounding Oklahoma.

[2]States having highest value added in the nation.

[3]States having value added 50 per cent above or below Oklahoma.

18 per cent below the national average of $8,208.

Wages and Salaries of All Employees and Wages of Production Workers

The total amount of wages and salaries received by all employees in food manufacturing in Oklahoma is larger than any other manufacturing industry in the state. Total wages and salaries of all employees amounted to $34 million compared with $3.8 billion in food manufacturing in the United States. Wages of production workers in food manufacturing were also higher than in any other manufacturing industry in Oklahoma. Production workers in food manufacturing in Oklahoma received $23 million, as against $2.6 billion in food manufacturing in the United States. Wages of production workers in food manufacturing were 66 per cent of total wages and salaries of all employees in food manufacturing in Oklahoma, slightly below the national average.

A production worker in food manufacturing in Oklahoma received an annual wage of about $2,066, compared with $2,339 in the United States. Thus, a production worker in food manufacturing in Oklahoma received $273 (13 per cent) less than the average annual wage of production workers in food manufacturing in the United States. The average annual wage per production worker in Oklahoma on the basis of 2,000 man-hours a year amounted to $1,840 as compared with $2,180 for the United States average. Here again an average production

worker in food manufacturing in the United States received $340 annually more than a production worker in food manufacturing in Oklahoma. Wages as a per cent of total value added in manufacturing of food in Oklahoma were slightly higher than the average for the nation. In Oklahoma wages of production workers in food manufacturing accounted for about 30 per cent, compared with 28 per cent in the United States.

The average hourly wage of a production worker in food manufacturing in Oklahoma was $0.92, 18 per cent below the national average of $1.09. Food manufacturing accounted for 26 per cent of the total number of man-hours of production worker time in all manufacturing in the state, and about 1 per cent of the national total in food manufacturing.

Food Manufacturing in Oklahoma and Surrounding States (Group A)

Number of Employees and Production Workers

The total number of employees and the number of production workers in food manufacturing in Oklahoma in 1947 were larger than in Arkansas and New Mexico, and smaller than in Texas, Missouri, Kansas and Colorado. (Table 16). Production workers as a percentage of all employees in food manufacturing were relatively greater in Oklahoma than in Missouri, Kansas, Colorado, and Arkansas, but smaller than in Texas

and New Mexico. Percentage variations among the states were, however, small.

Value Added by Manufacture

Oklahoma's standing among Group A states in food manufacturing is not substantially changed if we use value added by manufacture rather than employment data. Value added by food manufacture in Oklahoma was significantly greater than in Arkansas and New Mexico, but much less than in Texas, Missouri, Kansas, and Colorado. (Table 17). A similar pattern emerges from data on annual average value added per production worker. In Oklahoma annual average value added per production worker was 10 per cent below that in Colorado, 14 per cent below Texas, 22 per cent below Missouri, and somewhat below that in Kansas. On the other hand, it was 13 per cent above that in New Mexico and 27 per cent above value added in Arkansas.

Wages and Salaries of All Employees, and Wages of Production Workers

In Oklahoma total wages and salaries of all employees in food manufacturing amounted to about $34 million. This was slightly less than one-fourth the total wages and salaries of all employees in food manufacturing in Texas. Oklahoma's total wages and salaries of all employees were considerably lower than in Missouri, Arkansas, and Colorado. Compared

with Arkansas and New Mexico, Oklahoma's total wages and salaries were higher. Wages of production workers followed the same pattern.

Average annual wages per production worker in food manufacturing in Oklahoma were above those in Texas, Arkansas, and New Mexico, but below those in Missouri, Kansas, and Colorado. (Table 17). In food manufacturing in Oklahoma a production worker received an annual wage of $2,066, which was 19 per cent less than in Missouri, 20 per cent less than in Kansas, and 17 per cent less than in Colorado. It was, however, 7 per cent more than in Texas, 46 per cent more than in Arkansas, and 14 per cent more than in New Mexico. On the basis of 2,000 man-hours of production workers per year in food manufacturing, Oklahoma shows a similar standing relative to the surrounding states. A similar relationship exists for the average hourly wage per production worker in food manufacturing in Oklahoma and the neighboring states. A production worker in food manufacturing in Oklahoma received an hourly wage of $0.92, 22 per cent less than in Missouri and Kansas, and nearly 15 per cent less than in Colorado. On the other hand, it was 6 per cent more than in Texas, about 35 per cent more than in Arkansas, and 15 per cent more than in New Mexico. Oklahoma ranked lower than the weighted hourly wage of production workers for the surrounding states.

Food Manufacturing in Oklahoma Compared with the Five Highest States (Group B)

The five states which ranked highest in the nation, on the basis of value added by food manufacture in 1947, were Illinois, New York, California, Pennsylvania, and Ohio. These five states accounted for well over 40 per cent of the value added in food manufacturing in the nation. As might be expected, employment, value added by manufacture, annual and average wage rates in food manufacturing in these states were markedly higher than in Oklahoma. The purpose of examining the data is to find out how much higher.

Number of Employees and Production Workers

The number of employees in food manufacturing in each of the five highest states was, of course, substantially larger than in Oklahoma, ranging from about four-times the number in Ohio to almost ten-times in Illinois. Approximately the same ratios hold true with respect to the number of production workers, which means also that the ratio of production workers to total employees in food manufacturing in Oklahoma is about the same as in the five highest states. (Table 16).

Value Added by Manufacture

Value added in food manufacturing ranged from about five times the Oklahoma level in Ohio to 13 times in Illinois.

Value added per production worker was also significantly higher in each of the Group B states. Value added per production worker in Pennsylvania was 8 per cent above that in Oklahoma, but in the remaining states value added per worker ranged from 24 per cent higher in Ohio to 40 per cent higher in New York.

Wages and Salaries of All Employees, and Wages of Production Workers

Total wages and salaries in each of the Group B states were many times as great as in Oklahoma, and no further comment seems warranted in view of the much larger employment in these states. It is significant, however, that wages of production workers in food manufacturing in Oklahoma constituted a somewhat larger percentage of total value added in the industry than in any of the Group B states. Despite this fact, hourly and annual average wages per worker were substantially lower in Oklahoma than in any of the Group B states. In Ohio hourly wage rates in food manufacturing averaged 17 per cent above those in Oklahoma, while in California the rate was 41 per cent above that in Oklahoma. (Table 17).

Higher hourly wage rates are also the principal factor explaining the higher average annual wage per production worker in food manufacturing in the five highest states. It means, for example, that the higher annual income of produc-

tion workers in the five highest states is not explained by the ability of workers in these states to get a larger share of total value added than workers in Oklahoma. In Illinois and California, where hourly wage rates were highest, average annual income per production worker was about 30 per cent above that in Oklahoma. As noted earlier, in both these states total wages paid production workers was a smaller share of value added in food manufacturing than in Oklahoma.

Food Manufacturing in Oklahoma and Group C States

There are eleven states in Group C. In each of these states value added in food manufacturing was between 50 per cent above and below that in Oklahoma. As indicated by data in Table 17, these states are widely separated geographically and in many ways their industrial structure is different from that of Oklahoma.

Number of Employees and Production Workers

In five states in Group C (Oregon, Colorado, Florida, Virginia, and North Carolina) the number of employees was larger than in Oklahoma, while in the remaining six states the number was smaller. In Connecticut about two out of each three employees were classified as a production worker, whereas in Oregon, Colorado, Idaho, Utah, and Maine about four out of each five employees were production workers. In Oklahoma about three out of each four were production workers. (Table 16).

Value Added by Manufacture

In the five states with a larger number of employees than Oklahoma value added in food manufacturing was above that in Oklahoma, while value added in each of the remaining six states was below that in Oklahoma. Average annual value added per production worker in the various states, however, was noticeably different. In Connecticut and Idaho it was well above the national average and more than 25 per cent above that in Oklahoma. In the other nine states average value added per production worker was below the national average and, except for Oregon and Colorado, was also below that in Oklahoma. In Connecticut and Idaho average annual value added per production worker was higher than in three of the Group B states. Virginia ranked lowest on this score, and was only about three-fourths as large as in Oklahoma. (Table 17).

Wages and Salaries of All Employees, and Wages of Production Workers

Average annual wages per production worker varied among the Group C states from $1,414 in Arkansas to $2,426 in Connecticut. (Table 17). The average annual wage was higher in Oklahoma than in seven of the states in this group. In Oregon, Colorado, Connecticut, and Idaho the average annual wage was higher than in Oklahoma. The hourly wage rate was

also higher in these four states than in Oklahoma, and lower in the remaining seven states. As noted in the discussion of the Group B states, differences in hourly wage rates were the principal factor explaining differences in average annual wages of production workers in the Group C states. In those states where hourly wage rates were low, average annual wages were correspondingly low. The reverse is also true. States having relatively high hourly rates also had relatively high average annual wages.

Summary of the Chapter

The Group C states are widely scattered throughout the nation. Average annual value added per production worker in Oklahoma was higher than in seven of the Eleven states in this group. This was also true of average annual wages per production worker. The main factor which accounted for differences in annual average wages per production worker was differences in hourly wage rates.

CHAPTER VI

MACHINERY (EXCEPT ELECTRICAL) MANUFACTURING IN OKLAHOMA

Introduction

Machinery is the third most important manufacturing industry in Oklahoma on the basis of value added. Petroleum, food, machinery, and printing and publishing account for about 63 per cent of the total value added in all manufacturing industries in Oklahoma. The purpose of this chapter is to indicate the relative rank of Oklahoma with other states. In evaluating the relative importance of machinery in Oklahoma, a comparison is made with the average for the United States, with the neighboring states, with the five highest states, and with the states in which value added is within a range of 50 per cent above or below Oklahoma.

Employees engaged in machinery accounted for about 11 per cent of the total number of employees in all manufacturing industries in Oklahoma. Production workers in machinery show a similar relationship. Similarly the value added in machinery accounted for about 11 per cent of the total value added in all manufacturing industries in the state. Total

wages and salaries of all employees and the total wages of production workers in machinery show a similar proportion to the totals for all manufacturing industries in the state.

After food and printing and publishing, machinery has the largest number of manufacturing establishments in Oklahoma. Oklahoma has about 126 establishments in machinery, about 7 per cent of the total establishments for all manufacturing establishments in the state. About two-thirds of the establishments have less than 20 employees. The remaining one-third is almost equally divided between establishments with 20 to 100 employees, and those having 100 and more.

In Oklahoma employees in machinery accounted for 0.4 per cent of total employees in machinery in the United States. Value added in machinery in Oklahoma accounted for about 0.5 per cent of total value added in machinery in the nation. Production workers in machinery in Oklahoma receive about 0.5 per cent of the total wages paid to production workers in machinery throughout the United States. (Tables 18 and 19).

Production workers, value added by manufacture, and wages of production workers in machinery in Oklahoma each account for between 11 per cent and 13 per cent of the state totals in all manufacturing industries. On the other hand, compared with the national level, production workers, value

TABLE 18

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN MACHINERY (EXCEPT ELECTRICAL) MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	6,238	4,906	18,307	12,869	78.6	70.3
United States	1,545,323	1,244,135	4,804,563	3,592,771	80.5	74.8
GROUP A[1]						
Texas	23,299	18,327	69,908	49,335	78.7	70.6
Missouri	20,004	15,795	56,821	40,515	79.0	71.3
Kansas	5,023	4,185	13,170	10,128	83.3	76.9
Colorado	4,504	3,631	12,645	9,492	80.6	75.1
Arkansas	443	382	849	698	86.0	82.2
New Mexico	32	30	75	68	93.8	90.7
GROUP B[2]						
Ohio	227,760	186,250	725,766	549,722	81.8	75.7
Illinois	217,038	172,524	689,612	509,657	79.5	73.9
Michigan	143,171	119,168	489,277	376,048	83.2	76.8
New York	137,556	110,100	432,468	325,269	80.0	75.2
Pennsylvania	136,069	108,664	413,455	305,638	79.8	73.9
GROUP C[3]						
Maryland	10,418	8,123	30,375	20,993	78.0	69.1
Kentucky	10,175	8,034	28,546	20,149	79.0	70.6
New Hampshire	6,234	5,165	18,319	13,977	82.8	76.3
Vermont	7,128	5,622	20,431	14,489	78.9	70.9
Kansas	5,023	4,185	13,170	10,128	83.3	76.9
Georgia	6,408	5,327	15,479	11,424	83.1	73.8
Maine	6,443	5,557	17,531	14,837	86.2	84.6
Alabama	6,956	6,035	17,265	13,731	86.8	79.5
Washington	5,312	4,221	17,367	12,929	79.5	74.4
Tennessee	5,508	4,640	13,622	10,248	84.2	75.2
Colorado	4,504	3,631	12,645	9,492	80.6	75.1
Oregon	3,817	3,030	12,453	9,463	79.4	76.0

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

TABLE 19

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN MACHINERY (EXCEPT ELECTRICAL) MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by all Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	37,134	7,569	2,623	34.6	1.24	0.48
United States	7,812,455	6,279	2,888	46.0	1.39	
GROUP A[1]						
Texas	129,575	7,070	2,692	38.1	1.27	1.66
Missouri	109,412	6,927	2,565	37.0	1.26	1.40
Kansas	28,024	6,696	2,420	36.1	1.15	0.36
Colorado	22,550	6,210	2,614	42.1	1.26	0.29
Arkansas	2,207	5,777	1,827	31.6	0.89	0.03
New Mexico	115	3,833	2,267	59.1	1.05	....
GROUP B[2]						
Ohio	1,251,011	6,717	2,952	43.9	1.44	16.01
Illinois	1,096,146	6,354	2,954	46.5	1.42	14.03
Michigan	796,178	6,681	3,156	47.2	1.58	10.19
New York	678,701	6,164	2,954	47.9	1.41	8.69
Pennsylvania	665,443	6,124	2,813	45.9	1.34	8.52
GROUP C[3]						
Maryland	44,269	5,450	2,584	47.4	1.26	0.57
Kentucky	40,461	5,036	2,508	49.8	1.23	0.52
New Hampshire	32,209	6,236	2,706	43.4	1.24	0.41
Vermont	30,686	5,458	2,577	47.2	1.21	0.39
Kansas	28,024	6,696	2,420	36.1	1.15	0.36
Georgia	26,822	5,035	2,145	42.6	1.03	0.34
Maine	26,728	4,810	2,670	55.5	1.29	0.34
Alabama	26,455	4,384	2,275	51.9	1.14	0.34
Washington	25,233	5,978	3,063	51.2	1.58	0.32
Tennessee	24,256	5,228	2,209	42.2	1.06	0.31
Colorado	22,550	6,210	2,614	42.1	1.26	0.29
Oregon	19,463	6,423	3,123	48.6	1.56	0.25

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

added, and wages of production workers in machinery in Oklahoma each account for about 0.4 per cent of the totals for the United States.

Manufacturing of Machinery in Oklahoma Compared with the United States

Number of Employees and Production Workers

Oklahoma has about 6,000 employees compared with 1.5 millions in machinery throughout the nation, or about 0.4 per cent of the total for the United States. The number of production workers in machinery in Oklahoma is about 5,000 as against 1.2 millions in the United States, or roughly 0.4 per cent of the national total. Four out of five employees in machinery manufacturing in Oklahoma were classified as production workers in 1947, fractionally lower than the national average.

Value Added by Manufacture

Value added by manufacture in machinery in Oklahoma amounted to $37 million in 1947, about one-half of one per cent of the national total of $8 billions. (Table 18). Thus, Oklahoma accounts for only a small part of the nation's total, although it ranks high among the manufacturing industries of the state. The most significant fact about the machinery manufacturing industry in Oklahoma is the relatively high average annual value added per production worker. In 1947

it was $7, 569,more than 20 per cent above the national average. Not only was it higher than the national average, but was substantially above that in each of the Group A (surrounding) states, and markedly above each of the states in Group B (the five states in which value added was the highest in the nation) as well as above that in each of the 12 states in Group C. Average annual value added per production worker in Oklahoma was 50 per cent or more above that in many of the states in these three groups, and almost double that in New Mexico where machinery manufacture is relatively small. Average annual average value added per production worker in machinery in Oklahoma was not as high as in some other manufacturing industries in the state (such as petroleum, and printing and publishing), but was clearly above that of all other states with which comparison was made. These states account for about two-thirds of the value added by manufacturing in machinery throughout the nation.

Wages of Production Workers

In striking contrast with the high average annual value added per production worker in machinery, hourly wage rates, average annual wages of production workers, and wages of production workers as a per cent of value added in machinery were low. The average hourly wage rate of $1.24 was 10 per cent below the national average. (Table 19).

Compared with the Group A states, the hourly wage rate was above that in Kansas, Arkansas, and New Mexico, and below that in Texas, Missouri, and Colorado. The average hourly wage in Oklahoma was below that in each of the Group B states. Oklahoma's hourly rate occupied a mid-position among the Group C states. It was higher than in half of the states, and below that in the other half.

The relatively low hourly wage rate accounted for part of the low ranking among the states on the basis of average annual wages of production workers in manufacturing. In Oklahoma the average annual wage per production worker ($2,411) was considerably below the national average. Among the surrounding (Group A) states, however, it was above that in all except Texas, and almost 50 per cent above that in Arkansas. Compared with the states in which value added in machinery was highest in the nation (Group B), Oklahoma's wage was substantially lower. On the other hand, production workers in Oklahoma received relatively higher annual average wages than in most states in Group C. Among the 12 states in this group, the average wage in Oklahoma was higher than in all states except New Hampshire, Maine, Washington, and Oregon.

Another factor contributing to the low annual wages of production workers in machinery manufacturing in Oklahoma was the fact that these workers received a relatively small

percentage of the total value added by manufacture. In Oklahoma production workers received 35 per cent of the value added by manufacture, compared with a national average of 46 per cent. Among the surrounding states (Group A) production workers received a smaller percentage of value added than in each state except Arkansas. In the Group B states production workers received markedly higher percentages of value added than in Oklahoma. Production workers in Oklahoma also received a smaller percentage of value added than in each of the 12 states in Group C.

Summary

Machinery manufacturing in Oklahoma, therefore, is an industry of contrasts. It is relatively important among the various manufacturing industries of the state, but accounts for a small percentage of the national total. On the one hand, value added by manufacture per production worker is higher than the national average, and higher than in each of the states in Group A, B, and C. On the other hand, the high annual output per production worker was not reflected in high hourly or annual wages for these workers. Part of the explanation for the not-so-high annual wage is found in the relatively low hourly rate, and part was due to the fact that wages of production workers generally accounted for a smaller percentage of value added than in other states.

CHAPTER VII

PRINTING AND PUBLISHING IN OKLAHOMA

Printing and publishing is the fourth most important manufacturing industry in Oklahoma, surpassed only by petroleum, food, and machinery. In printing and publishing value added accounts for about 8 per cent of the total value added in all manufacturing industries in Oklahoma, compared with 23 per cent in petroleum, 22 per cent in food, and 11 per cent in machinery. The purpose of this chapter is to compare printing and publishing in Oklahoma with the national average, with the neighboring states, with the five highest states on the basis of value added, and with those states in which value added is within a range of 50 per cent above or below Oklahoma. Since printing and publishing is an important manufacturing industry in Oklahoma, this discussion will indicate the relative standing of Oklahoma with the United States as well as with other states.

In Oklahoma production workers in printing and publishing accounted for about 8 per cent of total production workers in all manufacturing industries in the state. Similarly, value added in printing and publishing accounted

for about 8 per cent of the total value added in all manufacturing industries in Oklahoma. Thus, in total number of production workers and value added, printing and publishing is almost as important as machinery. A similar proportion exists for wages and salaries of all employees and wages of production workers. Total wages of production workers in printing and publishing accounted for about 7 per cent of the total wages of production workers in all manufacturing industries in Oklahoma. Total man-hours of production workers in printing and publishing accounted for about 6 per cent of the total man-hours in all manufacturing industries in the state.

Next to food, printing and publishing has the largest number of establishments in Oklahoma. There are 1,740 establishments in all manufacturing industries in Oklahoma. Printing and publishing accounts for 374, about 22 per cent of the state total. The four important manufacturing industries (petroleum, food, machinery, and printing and publishing) accounted for about 68 per cent of the total number of establishments in all manufacturing industries in Oklahoma. Food, and printing and publishing account for about 58 per cent of the total number of establishments in Oklahoma. There were 325 establishments in printing and publishing out of a total of 374 in Oklahoma with less than 20 employees, 45 establishments with between 20 and 100 employees, and 4

establishments having more than 100 employees.

Compared with the United States, Oklahoma's printing and publishing industry is not very important. Oklahoma ranks 24th in the nation. Total employees, number of production workers, total value added, total wages and salaries of all employees, total wages of production workers, and total man-hours of production workers in printing and publishing in Oklahoma account for about 0.6 per cent of the national totals. Printing and publishing, thus, is an important manufacturing industry in Oklahoma, being fourth in terms of value added and second on the basis of the number of establishments. On the other hand, printing and publishing in Oklahoma accounts for only about ½ of 1 per cent of the total for the nation.

Total Number of Employees and Production Workers

In 1947 there were 5,000 employees in the printing and publishing industry of Oklahoma, 0.7 per cent of the national total of 715,000. In Oklahoma and the nation about 6 out of every 10 workers were classified as production workers. This proportion holds generally among the other 23 states with which Oklahoma is compared. (Table 20). Production workers ranged from 53 per cent of the total number of employees in New York to 67 per cent in Pennsylvania.

TABLE 20

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN PRINTING AND PUBLISHING MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers As Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	5,057	3,057	13,056	7,369	60.4	56.4
United States	715,450	438,135	2,277,263	1,318,285	61.2	57.9
GROUP A[1]						
Missouri	21,400	13,452	61,552	35,630	62.8	57.9
Texas	17,756	10,332	47,903	27,214	58.2	56.8
Kansas	5,651	3,394	13,445	7,678	60.1	57.1
Colorado	4,596	2,946	11,503	6,908	64.1	60.0
Arkansas	2,251	1,452	5,262	3,229	64.5	61.4
New Mexico	752	485	1,828	1,223	64.5	66.9
GROUP B[2]						
New York	166,492	87,757	570,338	286,584	52.7	50.2
Illinois	91,421	60,233	321,828	203,637	65.9	63.3
Pennsylvania	54,686	36,528	170,226	109,229	66.8	64.2
Ohio	49,943	32,976	155,053	96,181	66.0	62.0
California	41,914	24,258	145,647	82,717	57.9	56.8
GROUP C[3]						
Florida	6,288	3,592	18,103	10,348	57.1	57.2
Georgia	6,230	3,860	17,073	10,553	62.0	61.8
Virginia	5,861	3,704	15,534	9,605	63.2	61.8
Kentucky	6,194	4,332	16,913	11,507	69.9	68.0
Kansas	5,651	3,394	13,445	7,678	60.1	57.1
North Carolina	5,297	3,433	13,567	8,096	64.8	59.7
Oregon	4,493	2,404	13,576	7,643	53.5	56.3
Louisiana	3,973	2,274	10,965	6,272	57.2	57.2
Colorado	4,596	2,946	11,503	6,908	64.1	60.0
Nebraska	4,066	2,484	10,057	5,795	61.1	57.6
Alabama	3,742	2,114	10,219	5,527	56.5	54.1
Rhode Island	3,258	2,157	9,047	5,271	66.2	58.3
West Virginia	3,008	1,682	7,360	4,122	55.9	56.0

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947; Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

Value Added by Manufacture

The average annual value added per production worker in printing and publishing in Oklahoma was $9,009 in 1947, about 8 per cent below the national average. Value added per production worker in Oklahoma, however, was higher than in any surrounding state (Group A). It was below that in New York, Pennsylvania, Ohio, and California, but higher than in Illinois (Group B). There were 13 states in Group C. Value added per production worker was below that in four of these states (Florida, Oregon, Louisiana, and Alabama), but above that in nine other states (Georgia, Virginia, Kentucky, Kansas, North Carolina, Colorado, Nebraska, Rhode Island, and West Virginia).

Wages of production workers in Oklahoma accounted for 27 per cent of the value added by manufacturing in printing and publishing in 1947, compared with a national average of 31 per cent. (Table 21). Wages of production workers were a smaller percentage of value added than in each of the states in Group A. Wages in Oklahoma were a slightly larger percentage of value added than in New York, but in New York the average annual value added per production worker was 40 per cent greater than in Oklahoma. The result was that the average hourly wage rate was almost 40 per cent higher in New york than in Oklahoma, and the average annual wage of production workers was about 36 per cent greater than in Oklahoma.

TABLE 21

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN PRINTING AND PUBLISHING MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added By All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Ad in Each as Per C United S Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	27,542	9,009	2,411	26.8	1.19	0.6
United States	4,269,416	9,745	3,009	30.9	1.48	
GROUP A[1]						
Missouri	116,327	8,648	2,649	30.6	1.34	2.7
Texas	92,467	8,950	2,634	29.4	1.31	2.1
Kansas	26,201	7,720	2,262	29.3	1.10	0.6
Colorado	22,386	7,599	2,345	30.8	1.22	0.5
Arkansas	11,392	7,846	2,224	28.3	1.10	0.2
New Mexico	3,729	7,689	2,522	32.8	1.18	0.0
GROUP B[2]						
New York	1,127,727	12,851	3,266	25.4	1.63	26.4
Illinois	541,841	8,996	3,381	37.6	1.66	12.6
Pennsylvania	339,556	9,296	2,990	32.2	1.44	7.9
Ohio	322,283	9,773	2,917	29.8	1.42	7.5
California	261,064	10,762	3,410	31.7	1.71	6.1
GROUP C[3]						
Florida	34,706	9,662	2,881	29.8	1.41	0.8
Georgia	32,561	8,435	2,734	32.4	1.31	0.7
Virginia	29,867	8,063	2,593	32.2	1.19	0.7
Kentucky	28,745	6,636	2,656	40.0	1.24	0.6
Kansas	26,201	7,720	2,262	29.3	1.10	0.6
North Carolina	25,369	7,390	2,358	31.9	1.14	0.5
Oregon	24,311	10,113	3,179	31.4	1.66	0.5
Louisiana	23,005	10,117	2,758	27.3	1.34	0.5
Colorado	22,386	7,599	2,345	30.8	1.22	0.5
Nebraska	21,505	8,657	2,333	26.9	1.14	0.5
Alabama	19,764	9,349	2,614	28.0	1.24	0.4
Rhode Island	15,925	7,383	2,444	33.1	1.21	0.3
West Virginia	13,939	8,287	2,451	29.6	1.19	0.3

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

The significantly higher hourly and annual wage could be paid in New York because average annual value added per worker was high, even though production workers received a slightly smaller percentage of the total value added by manufacturing. Production workers in Oklahoma received a smaller percentage of value added by manufacture than was true in each of the 13 states in Group C.

Hourly Wages of Production Workers

Average hourly wage rates in printing and publishing in the nation were about 25 per cent above those in Oklahoma in 1947. The rate in Oklahoma ($1.19) was above that in Kansas, Arkansas, and New Mexico, but below the rate in Missouri, Texas, and Colorado. (Group A states). Oklahoma's rate was substantially below that in each of the Group B states. Oklahoma's rate was about the same as that in Virginia and West Virginia, and higher than in Kansas, North Carolina, and Nebraska. It was below that in eight other states in Group C (Florida, Georgia, Kentucky, Oregon, Louisiana, Colorado, Alabama, and Rhode Island). Among the 23 states for which data are shown in Table 21, average hourly wage rates of production workers ranged from $1.10 in Kansas and Arkansas to $1.71 in California.

Average Annual Wages of Production Workers

The average annual wage of production workers was

higher in Oklahoma than in Kansas, Arkansas, and Colorado among the Group A states; and higher than in North Carolina, Colorado, and Nebraska among the Group C states. It was lower than in all other states for which data are presented in Table 21, and about 25 per cent below the national average. Annual average wages of production workers ranged from $2,224 in Arkansas to $3,410 in California.

Broadly speaking, average annual wages tended to be high among those states in which average annual value added per production worker was high, but there were many exceptions. For example, value added per production worker was higher in Oklahoma than in each of the surrounding states (Group A), but average annual wages per production worker were higher in three of them (Missouri, Texas, and New Mexico) than in Oklahoma. In Missouri and Texas, where average annual wages were about 10 per cent higher than in Oklahoma, both the average hourly wage and wages as a per cent of total value added were above those in Oklahoma. In New Mexico, where the average annual wage was about 5 per cent higher, the average hourly wage was a penny lower than in Oklahoma. Furthermore, the average annual value added per production worker was lower than in Missouri or in Texas. The higher average annual wage was due entirely to the fact that employers paid production workers a larger share of the value added by manufacture.

On the other hand, in four of the five states in Group B (New York, Pennsylvania, Ohio, and California), average annual value added per production worker was higher than in Oklahoma. In each of these states the average hourly wage of production workers and the average annual wage were significantly higher than in Oklahoma. There were also four states in Group C in which average annual value added was above that in Oklahoma (Florida, Oregon, Louisiana, and Alabama). In each of these four states the average hourly wage and the average annual wage of production workers was significantly higher than in Oklahoma. Although production workers received a somewhat higher percentage of value added by manufacture in each of these states, higher average hourly wage rates were a more important factor contributing to the higher average annual wage.

The same pattern may be observed among the states in which the average annual wage was lower than in Oklahoma. In Kansas, Colorado, and Arkansas (among the Group A states) average annual wages were lower than in Oklahoma, and in each of these states average annual value added per production worker was also below that in Oklahoma. In two of these states (Arkansas and Kansas) the average hourly wage was lower, and in Colorado the hourly wage was only slightly above that in Oklahoma. The average hourly wage and the average annual wage were higher in each of the Group B states

than in Oklahoma. In addition to Kansas and Colorado (included among the Group A states), there were two states in Group C in which the average annual wage was below that in Oklahoma. They were North Carolina and Nebraska. In both of these states average annual value added per production worker and the average hourly wage rate were below those in Oklahoma. Despite the fact that employers paid production workers a slightly higher percentage of value added, average annual wages remained below those in Oklahoma.

Summary

Printing and publishing is Oklahoma's fourth most important manufacturing industry, although it accounts for only a fraction of one per cent of the national total. Most printing and publishing establishments in Oklahoma are small. Average annual value added per production worker in Oklahoma was below the national average and this largely explains the lower than average annual wage per production worker in Oklahoma. Production workers in Oklahoma received a smaller percentage of value added by manufacture than in any state in Group A, B, or C, except New York, but this smaller percentage does not explain the relatively low annual wage of production workers. For, in New York the average annual wage was more than a third higher than in Oklahoma. In most instances when value added per production worker is high, average hourly wages and annual wages are high; and when

average value added per worker is low, hourly and annual wages tend to be low. There were, however, important exceptions to this generalization.

CHAPTER VIII

OTHER MANUFACTURING INDUSTRIES IN OKLAHOMA

Introduction

In the four preceding chapters each of the major manufacturing industries (petroleum, food, machinery, and printing and publishing) have been discussed in some detail. These four industries account for about 63 per cent of the total value added in all manufacturing industries in Oklahoma. Petroleum is the most important, measured by total value added, but food surpasses all in total number of establishments, total employees, number of production workers, total wages, and total man-hours of production workers in Oklahoma. Furthermore, these four manufacturing industries (petroleum, food, machinery, and printing and publishing) account for about two-thirds of the total manufacturing industries in the state measured in terms of total number of establishments, total number of employees, number of production workers, amount of value added, total wages and salaries, and total man-hours of production workers.

In this chapter the remaining manufacturing industries

are grouped together, for they are relatively less important in Oklahoma. These industries in the relative order of total value added are stone, clay, and glass; fabricated metal products; primary metals; chemicals and allied products; lumber and products (except furniture); transportation equipment; furniture and fixtures; apparel and related products; paper and allied products; miscellaneous manufactures; and leather and leather products. Oklahoma does not report data separately for five manufacturing industries listed in the Census of Manufactures (tobacco, textile mill products, rubber products, electrical machinery, and instruments and related products.) Since each of these manufacturing industries are relatively small in Oklahoma, data for these have been grouped under "All Other Major Industry Groups." This particular item accounts for about 8 per cent of the total value added in all manufacturing industries in Oklahoma.

These 11 industries as well as "all other" major industry groups account for about one-third of the total value added in all manufacturing industries in Oklahoma. The five highest of these (stone, clay, and glass; fabricated metal products; primary metals; chemicals and allied products; and lumber and products) account for about 23 per cent of the total value added in all manufacturing industries in Oklahoma.

Compared with the nation, these 11 manufacturing industries in Oklahoma are small because their rank among the

states according to total value added varies from 20th to 40th. Seven of them have a rank of 30th or below in the country.

Number of establishments

The number of establishments in the manufacturing industries of this group in Oklahoma ranges from 6 in paper and allied products, and in leather and leather products, to 89 in fabricated metal products. They account for about 30 per cent of the total number of establishments in all manufacturing industries in the state. A few of the establishments in these industries are large and employ more than 100 persons each. Most of them, however, are small and have fewer than 20 employees. For example, in leather and leather products manufacturing there were no establishments in the state having more than 20 employees.

Stone, Clay, and Glass Manufacturing

In 1947 Oklahoma accounted for 1 per cent of the value added by manufacturing in the stone, clay, and glass industry of the nation. There were about 4,000 production employees in the industry in the state and production workers received about 40 per cent of the value added by manufacturing. (Tables 22 and 23). The average hourly wage rate of $1.09 was below the national average, but higher than in all surrounding states, except Texas. The hourly rate was well

TABLE 22

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN STONE, CLAY, AND GLASS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	4,373	3,956	10,637	9,126	90.5	85.8
United States	462,072	405,755	1,210,768	994,884	87.8	82.2
GROUP A[1]						
Missouri	14,999	13,001	41,057	32,431	86.7	79.0
Texas	10,629	9,284	23,298	18,742	87.3	80.4
Kansas	3,305	2,853	8,006	6,431	86.3	80.3
Colorado	2,430	2,169	5,796	4,894	89.2	84.4
Arkansas	2,492	2,324	5,738	5,142	93.2	89.6
New Mexico	326	290	534	443	89.0	83.0
GROUP B[2]						
Pennsylvania	72,871	64,394	190,924	159,199	88.4	83.4
Ohio	59,720	53,385	157,091	132,910	89.4	84.6
New York	39,216	33,189	111,544	87,040	84.6	78.0
Illinois	30,705	26,388	86,736	69,409	85.9	80.0
California	27,160	23,825	77,916	65,620	87.7	84.2
GROUP C[3]						
Maryland	6,810	5,994	16,692	13,931	88.0	83.4
Tennessee	8,332	7,525	17,442	14,631	90.3	83.9
Alabama	6,296	5,642	13,404	11,122	89.6	83.6
Connecticut	5,690	4,623	16,664	12,459	81.2	74.8
Iowa	4,613	4,060	11,503	9,492	88.0	82.5
Georgia	6,954	6,245	13,896	11,521	89.8	82.9
Virginia	4,667	4,150	9,942	7,835	88.9	78.8
North Carolina	5,555	5,050	10,644	8,802	90.9	82.7
Kansas	3,305	2,853	8,006	6,431	86.3	80.3
Washington	3,320	2,907	9,366	7,912	87.6	84.5
Louisiana	3,392	2,963	8,645	7,128	87.4	82.4
Kentucky	4,203	3,834	9,301	8,060	91.2	86.6
Minnesota	3,612	3,249	8,357	7,035	90.0	84.2
Florida	2,675	2,403	5,926	4,968	89.8	83.8
Vermont	2,592	2,279	7,088	6,039	87.9	85.2
Colorado	2,430	2,169	5,796	4,894	89.2	84.4

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

TABLE 23

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN STONE, CLAY, AND GLASS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	23,411	5,918	2,307	39.0	1.09	1.02
United States	2,306,480	5,684	2,452	43.1	1.18	
GROUP A[1]						
Missouri	80,586	6,198	2,494	40.2	1.21	3.49
Texas	57,646	6,209	2,019	32.5	0.92	2.50
Kansas	17,527	6,143	2,254	36.7	1.08	0.76
Colorado	11,966	5,517	2,256	40.9	1.07	0.52
Arkansas	10,237	4,405	2,213	50.2	0.99	0.44
New Mexico	1,030	3,552	1,528	43.0	0.84	0.04
GROUP B[2]						
Pennsylvania	339,841	5,278	2,472	46.8	1.23	14.73
Ohio	293,881	5,505	2,490	45.2	1.22	12.74
New York	209,104	6,300	2,623	41.6	1.23	9.06
Illinois	175,996	6,670	2,630	39.4	1.24	7.63
California	153,884	6,459	2,754	42.6	1.31	6.67
GROUP C[3]						
Maryland	33,472	5,584	2,324	41.6	1.07	1.45
Tennessee	32,787	4,357	1,944	44.6	0.93	1.42
Alabama	30,926	5,481	1,971	36.0	0.94	1.34
Connecticut	28,079	6,074	2,695	44.4	1.26	1.22
Iowa	27,083	6,671	2,338	35.0	1.04	1.17
Georgia	26,651	4,268	1,845	43.2	0.86	1.16
Virginia	20,456	4,929	1,888	38.3	0.90	0.89
North Carolina	19,519	3,865	1,743	45.1	0.83	0.85
Kansas	17,527	6,143	2,254	36.7	1.08	0.76
Washington	17,203	5,918	2,722	46.0	1.34	0.74
Louisiana	16,589	5,599	2,406	43.0	1.22	0.72
Kentucky	16,302	4,252	2,102	49.4	1.04	0.71
Minnesota	15,706	4,834	2,165	44.8	0.93	0.68
Florida	12,809	5,330	2,067	38.8	0.89	0.56
Vermont	12,583	5,521	2,650	48.0	1.22	0.54
Colorado	11,966	5,517	2,256	40.9	1.07	0.52

*Source: Compiled from data in U.S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U.S. Government Printing Office, 1950).

[1]States surrounding Oklahoma.

[2]States having highest value added in the nation.

[3]States having value added 50 per cent above or below Oklahoma.

below that in all states in Group B but higher than the prevailing rate in most states in Group C. Among the latter group hourly rates were higher than in Oklahoma only in Connecticut, Washington, Louisiana, and Vermont. The Oklahoma rate was higher than in 12 other states in this group.

Average annual value added per production worker was well above the national average. It was lower than in Missouri, Texas, and Kansas, but above that in the other three surrounding states. It was higher than in Pennsylvania and Ohio, but below that in the other three states in Group B. In Connecticut and Iowa average annual value added per production worker was higher than in Oklahoma, but in the other states in Group C average value added was lower.

The average annual wage of production workers in Oklahoma was below the national average, but was higher than in all states in Group A, except Texas. In each state in Group B higher average hourly rates resulted in substantially higher average annual wages. Compared with the Group C states, wages in Oklahoma were higher than in about half of them and lower than in the other half. Part of the explanation for a higher average annual wage in some states was because employers paid production workers a higher portion of value added by manufacture, but the more important factor in most instances was a higher average hourly wage rate.

Fabricated Metal Products Manufacturing

This industry employed 2,722 production workers in Oklahoma in 1947, less than one half of one per cent of the national total. (Table 24). The average annual value added per production worker was $6,929, about $1,000 above the national average. Average value added was higher in Oklahoma than in all states in Group A, except Kansas and New Mexico. It was higher than in each of the states in Group B, which together accounted for about 55 per cent of total value added in this industry in the nation. (Table 25). Value added in Oklahoma was also higher than in each state in Group C (except Kansas which was included among the Group A states).

Despite the high average annual value added, however, average annual wages of production workers in Oklahoma were substantially below the national average. They were below those in each state in Group A, except Arkansas; and well below those in all states in Group B. In Georgia, North Carolina, and Florida average annual wages were below those in Oklahoma, but they were higher in all other states in Group C.

In many industries previously examined, the principal reason production workers received higher average annual wages in some states than they did in Oklahoma was that hourly wage rates were higher, rather than because employers paid production workers a larger portion of total value

TABLE 24

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN FABRICATED METAL PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	3,521	2,722	9,686	6,338	77.3	65.4
United States	971,461	822,514	2,832,835	2,188,581	84.7	77.2
GROUP A[1]						
Missouri	22,773	19,072	62,899	46,162	83.7	73.4
Texas	13,143	10,964	35,038	26,938	83.4	76.9
Kansas	3,977	3,166	11,462	8,169	79.6	71.3
Colorado	2,326	1,904	6,360	4,694	81.8	73.8
Arkansas	758	667	1,804	1,403	88.0	77.8
New Mexico	151	99	508	293	65.6	57.7
GROUP B[2]						
Ohio	122,114	102,759	361,337	276,833	84.2	76.6
Illinois	116,642	98,434	352,295	271,450	84.4	77.0
Pennsylvania	113,461	96,677	319,482	249,207	85.2	78.0
Michigan	90,853	78,360	286,706	226,760	86.2	79.1
New York	88,645	74,987	265,871	201,827	84.6	75.9
GROUP C[3]						
Iowa	5,271	4,263	15,439	11,422	80.9	74.0
Washington	4,663	3,877	14,724	11,571	83.1	78.6
Virginia	5,792	4,776	15,221	11,242	82.4	73.8
Kansas	3,977	3,166	11,462	8,169	79.6	71.3
Oregon	3,891	3,294	12,464	9,903	84.6	79.4
Louisiana	3,749	3,092	9,326	7,083	82.5	75.9
Georgia	3,456	3,034	8,144	6,555	87.8	80.5
North Carolina	2,822	2,282	6,587	4,669	80.9	70.9
Florida	2,158	1,817	5,439	4,139	84.2	76.1
Colorado	2,326	1,904	6,360	4,694	81.8	73.8
Delaware	2,104	1,754	6,101	4,488	83.4	73.6

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

[1] States surrounding Oklahoma.

[2] States having highest value added in the nation.

[3] States having value added 50 per cent above or below Oklahoma.

TABLE 25

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN FABRICATED METAL PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	18,862	6,929	2,328	33.6	1.11	0.38
United States	4,921,476	5,983	2,661	44.5	1.29	
GROUP A[1]						
Missouri	112,587	5,903	2,420	41.0	1.19	2.29
Texas	66,826	6,095	2,457	40.3	1.15	1.36
Kansas	22,037	6,961	2,580	37.1	1.21	0.45
Colorado	11,261	5,914	2,465	41.7	1.17	0.23
Arkansas	3,517	5,273	2,103	39.9	1.02	0.07
New Mexico	758	7,657	2,960	38.6	1.45	0.02
GROUP B[2]						
Ohio	634,746	6,177	2,694	43.6	1.33	12.90
Illinois	626,014	6,360	2,758	43.4	1.31	12.72
Pennsylvania	533,319	5,516	2,578	46.7	1.28	10.84
Michigan	496,091	6,331	2,894	45.7	1.45	10.08
New York	461,532	6,155	2,691	43.7	1.28	9.38
GROUP C[3]						
Iowa	27,649	6,486	2,679	41.3	1.21	0.56
Washington	26,719	6,892	2,985	43.3	1.53	0.54
Virginia	26,660	5,582	2,354	42.2	1.09	0.54
Kansas	22,037	6,961	2,580	37.1	1.21	0.45
Oregon	20,685	6,280	3,006	47.9	1.51	0.42
Louisiana	15,985	5,170	2,291	44.3	1.11	0.32
Georgia	14,951	4,928	2,168	43.8	1.05	0.30
North Carolina	11,909	5,219	2,046	39.2	0.97	0.24
Florida	11,571	6,368	2,278	35.8	1.08	0.24
Colorado	11,261	5,914	2,465	41.7	1.17	0.23
Delaware	9,535	5,436	2,559	47.1	1.23	0.19

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

[1]States surrounding Oklahoma.

[2]States having highest value added in the nation.

[3]States having value added 50 per cent above or below Oklahoma.

added. But in the case of manufacturing of fabricated metal products both factors were important. Production workers in Oklahoma received 33.6 per cent of the value added by manufacturing in 1947, compared with a national average of 44.5 per cent. The share of value added received by workers in Oklahoma was lower than in any state in Group A, B, or C. This smaller share of value added was a principal contributing factor to the relatively low average annual wage. Hourly wage rates in Oklahoma were also significantly below the national average, and below the rates in all states in Group A and B, except Arkansas. The Oklahoma rate was the same as in Louisiana, and higher than in Virginia, Georgia, North Carolina, and Florida, but below that in the other states in Group C.

Primary Metals Manufacturing

In 1947 there were 3,100 production workers in this industry in Oklahoma, less than 0.3 per cent of the national total. (Tables 26 and 27.) Average annual value added per production worker was higher than in Missouri and Colorado, but below that in Texas and Arkansas. Compared with the Group B states, the Oklahoma average was slightly higher than in Pennsylvania and Michigan, but lower than in Ohio, Illinois, and Indiana. Oklahoma's average was higher than in Iowa and Virginia but lower than that in other states in Group C.

TABLE 26

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN PRIMARY METALS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	3,374	3,103	8,623	7,498	92.0	87.0
United States	1,157,124	1,010,055	3,594,548	2,976,507	87.3	82.8
GROUP A[1]						
Missouri	13,335	11,856	37,714	31,206	88.9	82.7
Texas	11,682	10,585	32,526	27,923	90.6	85.8
Colorado	7,880	7,481	24,001	22,260	94.9	92.7
Arkansas	2,917	2,672	7,123	6,417	91.6	90.1
GROUP B[2]						
Pennsylvania	263,542	231,324	808,729	672,474	87.8	83.2
Ohio	177,222	156,736	560,078	474,364	88.4	84.7
Illinois	101,821	88,444	329,698	269,163	86.9	81.6
Indiana	82,295	71,336	267,903	222,638	86.7	83.1
Michigan	92,606	81,100	305,439	252,309	87.6	82.6
GROUP C[3]						
Oregon	3,002	2,560	8,946	7,513	85.3	84.0
Arkansas	2,917	2,672	7,123	6,417	91.6	90.1
Iowa	3,206	2,888	9,086	7,825	90.1	86.1
Virginia	3,754	3,479	9,366	8,174	92.7	87.3
Idaho	948	828	3,240	2,663	87.3	82.2

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 27

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN PRIMARY METALS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	16,442	5,299	2,416	45.6	1.20	0.28
United States	5,765,434	5,708	2,947	51.6	1.45	
GROUP A[1]						
Missouri	59,673	5,033	2,632	52.3	1.30	1.04
Texas	58,337	5,511	2,638	47.9	1.25	1.01
Colorado	37,395	4,999	2,976	59.5	1.41	0.65
Arkansas	18,885	7,068	2,402	34.0	1.12	0.33
GROUP B[2]						
Pennsylvania	1,219,042	5,270	2,907	55.2	1.48	21.14
Ohio	852,772	5,441	3,027	55.6	1.51	14.79
Illinois	557,712	6,306	3,043	48.3	1.47	9.67
Indiana	449,218	6,297	3,121	49.6	1.53	7.79
Michigan	427,239	5,268	3,111	59.0	1.53	7.41
GROUP C[3]						
Oregon	19,782	7,727	2,935	38.0	1.52	0.34
Arkansas	18,885	7,068	2,402	34.0	1.12	0.33
Iowa	12,939	4,480	2,709	60.5	1.28	0.22
Virginia	12,801	3,679	2,350	63.8	1.06	0.22
Idaho	10,492	12,671	3,216	25.4	1.42	0.18

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

The average annual wage in the nation was about 20 per cent higher than in Oklahoma. The annual wage of production workers in Oklahoma was below that in all states in Groups A, B, and C, except Arkansas. The principal reason for Oklahoma's relatively low standing was that hourly wage rates were about 20 per cent below the national average. Among all the states for which data are presented in Table 27, the hourly rate in Oklahoma was lower, except in Arkansas.

Chemical and Allied Products Manufacturing

This industry accounted for less than one-fourth of one per cent of the national total in 1947, (Table 29), and employed only 1,200 production workers. (Table 28). Throughout the nation average annual average value added per production worker is high, relative to most industries, and it was also high in Oklahoma. Average annual value added in this industry is twice as high as in many other manufacturing industries. In Oklahoma it amounted to $10,047, somewhat below the national average.

Although average annual average value added was high, average annual wages of production workers were not substantially different from those industries in which value added per worker was much lower. The principal reason is that in most states production workers received a much smaller percentage of value added than in many other industries. In 1947 production workers received 23.2 per cent of the value added

TABLE 28

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN CHEMICALS AND ALLIED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	1,589	1,207	4,097	2,806	76.0	68.5
United States	623,319	466,458	1,910,463	1,242,628	73.8	65.0
GROUP A[1]						
Texas	23,552	17,475	68,575	46,398	74.2	67.7
Missouri	15,568	10,761	45,442	27,032	69.1	59.5
Kansas	5,134	3,929	16,222	11,254	76.5	69.4
Arkansas	4,145	3,461	11,013	8,653	83.5	78.6
New Mexico	1,237	1,052	4,156	3,264	85.0	78.5
Colorado	1,275	818	3,792	2,067	64.2	54.5
GROUP B[2]						
New Jersey	82,527	59,760	271,545	177,623	72.4	65.4
New York	69,066	49,344	218,432	135,011	71.5	61.8
Illinois	46,313	32,733e	144,458	86,573	70.7	59.9
Ohio	37,318	26,705	116,494	74,064	71.6	63.6
Pennsylvania	43,648	32,403	131,379	85,614	74.2	65.2
GROUP C[3]						
South Carolina	3,637	3,051	6,776	4,773	83.9	70.4
Washington	2,086	1,367	6,850	3,932	65.5	57.4
New Mexico	1,237	1,052	4,156	3,264	85.0	78.5
Oregon	1,155	792	3,490	2,164	68.6	62.0
Nebraska	1,456	931	4,181	2,362	63.9	56.5
Rhode Island	1,349	918	4,347	2,257	68.0	51.9
Colorado	1,275	818	3,792	2,067	64.2	54.5

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 29

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN CHEMICALS AND ALLIED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	12,127	10,047	2,325	23.1	0.92	0.23
United States	5,365,201	11,502	2,664	23.2	1.27	
GROUP A[1]						
Texas	234,496	13,419	2,655	19.8	1.21	4.37
Missouri	129,257	12,012	2,512	20.9	1.22	2.41
Kansas	66,990	17,050	2,864	16.8	1.34	1.25
Arkansas	29,194	8,435	2,500	29.6	1.05	0.54
New Mexico	13,738	13,059	3,103	23.8	1.53	0.26
Colorado	8,271	10,111	2,527	25.0	1.20	0.15
GROUP B[2]						
New Jersey	744,601	12,479	2,977	23.8	1.42	13.88
New York	596,038	12,079	2,736	22.6	1.30	11.11
Illinois	433,059	13,230	2,645	20.0	1.28	8.07
Ohio	347,226	13,002	2,773	21.3	1.33	6.47
Pennsylvania	314,720	9,713	2,642	27.2	1.26	5.86
GROUP C[3]						
South Carolina	16,595	5,439	1,564	28.8	0.70	0.31
Washington	15,570	11,390	2,876	25.2	1.40	0.29
New Mexico	13,738	13,059	3,103	23.8	1.53	0.26
Oregon	11,750	14,836	2,732	18.4	1.36	0.22
Nebraska	10,926	11,736	2,537	21.6	1.11	0.20
Rhode Island	10,239	11,154	2,459	22.0	1.14	0.19
Colorado	8,271	10,111	2,527	25.0	1.20	0.15

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

throughout the nation, and in Oklahoma production workers received about the same share.

The average annual wage of production workers in Oklahoma was $2,325 in 1947, about 10 per cent below the national average. The wage in Oklahoma was below that in all states in Groups A, B, and C, except South Carolina. Practically the entire explanation was due to Oklahoma's relatively low hourly wage rate, which was lower than in each of the states except South Carolina.

Lumber and Lumber Products (except Furniture) Manufacturing

This industry employed about 2,000 production workers in Oklahoma in 1947, about one third of one per cent of the national total. (Table 30 and 31). Average annual value added per production worker ($3,920) was below the national average but above that in Texas, Arkansas, Missouri, and Colorado among the Group A states; and above that in Alabama (and Texas) among the Group B states. Among Group C states it was above Colorado, but below New Mexico and Connecticut.

Average hourly and annual wages of production workers in lumber and lumber products were among the lowest of all manufacturing industries in the state. The hourly wage was $0.82, and the average annual wage of production workers amounted to only $1,789. The hourly wage was lower than in each of the states for which data are shown in Table 31, except in Texas, Arkansas, and Alabama. The same was true

TABLE 30

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN LUMBER AND PRODUCTS (EXCEPT FURNITURE) MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	2,324	2,075	4,586	3,713	89.3	81.1
United States	6,357,708	596,118	1,337,612	1,179,981	93.8	88.2
GROUP A[1]						
Texas	30,694	29,354	51,387	47,267	95.6	92.0
Arkansas	28,247	26,839	47,295	42,741	95.0	90.4
Missouri	7,152	6,527	14,313	12,025	91.3	84.0
New Mexico	1,910	1,855	4,002	3,824	97.1	95.6
Colorado	2,282	2,151	5,020	4,435	94.2	88.3
Kansas	935	806	2,085	1,629	86.2	78.1
GROUP B[2]						
Oregon	51,532	48,082	164,203	147,956	93.3	90.1
Washington	43,034	40,096	134,993	120,838	93.2	89.5
California	38,477	35,445	123,349	109,516	92.1	88.8
Alabama	37,392	36,130	49,530	45,586	96.6	92.0
Texas	30,694	29,354	51,387	47,267	95.6	92.0
GROUP C[3]						
New Mexico	1,910	1,855	4,002	3,824	97.1	95.6
Colorado	2,282	2,151	5,020	4,435	94.2	88.3
Connecticut	1,545	1,399	3,910	3,358	90.6	85.9

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 31

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN LUMBER AND PRODUCTS (EXCEPT FURNITURE) MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	8,135	3,920	1,789	45.6	0.82	0.32
United States	2,497,192	4,189	1,979	47.2	0.95	
GROUP A[1]						
Texas	95,899	3,270	1,610	49.2	0.74	3.84
Arkansas	81,361	3,031	1,592	52.5	0.73	3.26
Missouri	24,067	3,687	1,842	50.0	0.88	0.96
New Mexico	8,250	4,447	2,061	46.4	1.11	0.33
Colorado	8,106	3,768	2,062	54.7	1.04	0.32
Kansas	3,731	4,629	2,021	43.7	0.94	0.15
GROUP B[2]						
Oregon	363,561	7,561	3,077	40.7	1.57	14.56
Washington	279,458	6,970	3,014	43.2	1.56	11.19
California	226,183	6,381	3,090	48.4	1.51	9.06
Alabama	101,063	2,797	1,262	45.1	0.61	4.05
Texas	95,988	3,270	1,610	49.2	0.74	3.84
GROUP C[3]						
New Mexico	8,250	4,447	2,061	46.4	1.11	0.33
Colorado	8,106	3,768	2,062	54.7	1.04	0.32
Connecticut	7,115	5,086	2,400	47.2	1.08	0.28

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

of average annual wages of production workers in this industry.

Transportation Equipment Manufacturing

This industry was not important in Oklahoma in 1947. It employed only 1,000 production workers, about one per cent of the national total. (Table 32). The average annual value added per production worker of $5,373 was about 10 per cent below the national average. It was below that in all states in Groups A and B, except Arkansas. On the other hand, it was above that in Nebraska, Maine, and North Carolina among Group C states.

The average hourly wage was 20 per cent below the national level. It was below that in Missouri, Texas, and Kansas, but higher than in Colorado and Arkansas. (Table 33). the hourly rate was well below that in all states in Group B, but higher than in Nebraska and Maine among the Group C states. The same general pattern holds with respect to the average annual wage of production workers. Differences in hourly wage rates largely explain the differences in average annual wages.

Furnitue and Fixtures Manufacturing

In 1947 there were 4,000 production workers in this industry (Table 34), and they accounted for slightly less than one-third of one per cent of the value added in the

TABLE 32

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN TRANSPORTATION EQUIPMENT MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	1,336	1,034	3,190	2,444	77.4	76.6
United States	1,181,682	987,142	3,719,583	2,939,815	83.5	79.0
GROUP A[1]						
Missouri	27,857	22,641	80,211	60,849	81.3	75.9
Texas	20,735	18,285	57,434	46,651	88.2	81.2
Kansas	9,847	8,254	31,314	24,437	83.8	78.0
Colorado	663	537	1,985	1,359	81.0	68.5
Arkansas	321	276	572	454	86.0	79.4
GROUP B[2]						
Michigan	384,773	331,680	1,230,723	1,011,378	86.2	82.2
California	112,242	86,192	362,803	257,145	76.8	70.9
Ohio	93,876	78,017	300,491	236,431	83.1	78.7
Indiana	75,821	63,729	246,849	200,514	84.0	81.2
New York	89,803	75,162	280,298	219,213	83.7	78.2
GROUP C[3]						
Nebraska	1,584	1,398	3,654	2,983	88.2	81.6
Maine	3,492	3,148	9,088	7,803	90.1	85.9
North Carolina	1,231	1,068	3,042	2,306	86.8	75.8
Colorado	663	537	1,985	1,359	81.0	68.5

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 33

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN TRANSPORTATION EQUIPMENT MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	5,556	5,373	2,364	44.0	1.20	0.09
United States	5,869,196	5,946	2,978	50.1	1.49	
GROUP A[1]						
Missouri	173,131	7,647	2,688	35.1	1.34	2.95
Texas	91,893	5,026	2,551	50.8	1.29	1.56
Kansas	51,347	6,220	2,961	47.6	1.43	0.87
Colorado	3,100	5,773	2,531	43.8	1.18	0.05
Arkansas	1,111	4,025	1,645	40.9	0.79	0.02
GROUP B[2]						
Michigan	1,938,214	5,844	3,049	52.2	1.55	33.02
California	553,718	6,424	2,983	46.4	1.49	9.43
Ohio	483,421	6,196	3,031	48.9	1.52	8.24
Indiana	442,080	6,937	3,146	45.4	1.57	7.53
New York	408,482	5,435	2,917	53.7	1.45	6.96
GROUP C[3]						
Nebraska	6,074	4,345	2,134	49.1	1.04	0.10
Maine	5,600	1,779	2,479	139.0	1.26	0.10
North Carolina	5,218	4,886	2,159	44.2	1.08	0.09
Colorado	3,100	5,773	2,531	43.8	1.18	0.05

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 34

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN FURNITURE AND FIXTURES MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	1,222	1,064	2,847	2,068	87.1	72.6
United States	322,384	282,780	824,061	653,915	87.7	79.4
GROUP A[1]						
Missouri	7,515	6,275	17,807	13,288	83.5	74.6
Texas	5,843	5,119	12,455	9,740	87.6	78.2
Arkansas	3,178	2,864	6,425	4,875	90.1	75.9
Kansas	1,019	919	2,307	1,922	90.2	83.3
Colorado	672	591	1,486	1,197	87.9	80.6
New Mexico	144	124	280	215	86.1	76.8
GROUP B[2]						
New York	37,686	32,463	112,003	89,450	86.1	79.9
Illinois	29,833	25,793	84,597	66,156	86.4	78.2
Ohio	26,291	22,260	74,439	56,989	84.7	76.6
North Carolina	27,858	25,939	53,865	45,364	93.1	84.2
Michigan	22,314	19,473	63,209	50,274	87.3	79.5
GROUP C[3]						
South Carolina	2,468	2,295	4,541	3,759	93.0	82.8
Vermont	1,765	1,598	3,735	3,057	90.5	81.8
Alabama	1,558	1,375	2,816	2,047	88.2	72.7
New Hampshire	1,373	1,232	3,241	2,634	89.7	81.3
Louisiana	1,344	1,224	2,611	2,062	91.1	79.0
Nebraska	984	848	2,363	1,737	86.2	73.5
Kansas	1,019	919	2,307	1,922	90.2	83.3
West Virginia	884	805	1,778	1,458	91.1	82.0
Mississippi	1,559	1,333	2,765	2,098	85.5	75.9
Rhode Island	792	650	2,175	1,487	82.1	68.4
Colorado	672	591	1,486	1,197	87.9	80.6
Maine	655	579	1,367	1,107	88.4	81.0

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

United States. Value added per production worker at the national level was about 20 per cent above that in Oklahoma. The Oklahoma average was lower than in Missouri, Texas, and Colorado but higher than in Arkansas, Kansas, and New Mexico. It was lower than in all states in Group B, except North Carolina. (Table 35). Average value added in Oklahoma was higher than in South Carolina, Vermont, Alabama, New Hampshire, Louisiana, West Virginia, Mississippi, and Maine among the Group C states. Hourly wages and annual wages of production workers followed the same pattern. The average hourly wage of production workers in Oklahoma was $0.92, while the average annual wage was $1,944.

Apparel and Related Products Manufacturing

There were only 733 production workers in this industry in Oklahoma in 1947. (Table 36). Hourly and average annual wages of production workers were among the lowest in all manufacturing industries in the state. The average hourly rate of $0.69 was below that in all states for which data are shown in Table 37, except Arkansas and New Mexico. The rate was the same as that in Texas, Average value added per production worker was usually low throughout the United States and average annual wages were also low. In Oklahoma the average annual wage of production workers was $1,309, compared with a national average of $2,071.

TABLE 35

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN FURNITURE AND FIXTURES MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	4,339	4,078	1,944	47.7	0.92	0.31
United States	1,377,908	4,873	2,312	47.4	1.10	
GROUP A[1]						
Missouri	28,040	4,469	2,118	47.4	1.03	2.03
Texas	23,029	4,499	1,903	42.3	0.91	1.67
Arkansas	11,439	3,994	1,702	42.6	0.79	0.83
Kansas	3,492	3,800	2,091	55.0	0.99	0.25
Colorado	2,655	4,492	2,025	45.1	1.01	0.19
New Mexico	429	3,460	1,734	50.1	0.79	0.03
GROUP B[2]						
New York	187,270	5,769	2,755	47.8	1.30	13.59
Illinois	146,953	5,697	2,565	45.0	1.24	10.66
Ohio	128,293	5,763	2,560	44.4	1.25	9.31
North Carolina	102,447	3,950	1,749	44.3	0.84	7.43
Michigan	94,922	4,875	2,582	53.0	1.23	6.89
GROUP C[3]						
South Carolina	6,484	2,825	1,638	58.0	0.79	0.47
Vermont	5,134	3,213	1,913	59.5	0.87	0.37
Alabama	4,972	3,616	1,489	41.2	0.73	0.36
New Hampshire	4,885	3,965	2,138	53.9	0.98	0.35
Louisiana	4,613	3,769	1,685	44.7	0.80	0.33
Nebraska	3,956	4,665	2,048	43.9	0.95	0.29
Kansas	3,492	3,800	2,091	55.0	0.99	0.25
West Virginia	3,103	3,855	1,811	47.0	0.89	0.22
Mississippi	2,947	2,211	1,574	71.2	0.72	0.21
Rhode Island	2,918	4,489	2,288	51.0	1.04	0.21
Colorado	2,655	4,492	2,025	45.1	1.01	0.19
Maine	2,207	3,812	1,912	50.2	0.89	0.16

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 36

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN APPAREL AND RELATED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	855	733	1,311	1,012	90.4	77.2
United States	1,081,844	972,897	2,527,499	2,015,220	89.9	79.7
GROUP A[1]						
Missouri	37,493	33,411	74,901	56,863	89.1	75.9
Texas	22,008	20,164	35,065	27,563	91.6	78.6
Kansas	2,178	1,945	3,432	2,730	89.4	79.5
Arkansas	2,482	2,334	3,625	2,844	94.0	78.4
Colorado	1,632	1,426	3,138	2,360	87.4	75.2
New Mexico	295	258	391	319	87.4	81.6
GROUP B[2]						
New York	382,846	333,794	1,125,804	875,057	87.2	77.7
Pennsylvania	140,906	132,063	263,334	227,769	93.7	86.5
New Jersey	69,989	65,694	156,196	134,404	93.9	86.0
Illinois	60,187	52,667	148,878	111,545	87.5	74.9
California	43,144	38,655	111,154	90,226	89.6	81.2
GROUP C[3]						
Utah	1,179	1,097	1,752	1,414	93.0	80.7

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 37

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN APPAREL AND RELATED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker	Average Annual Wage Per Production Worker	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	2,466	3,190	1,309	41.0	0.69	0.06
United States	4,443,373	4,567	2,071	45.4	1.11	
GROUP A[1]						
Missouri	130,549	3,907	1,702	43.6	0.90	2.94
Texas	71,128	3,527	1,367	38.8	0.69	1.60
Kansas	6,818	3,505	1,404	40.0	0.75	0.15
Arkansas	5,623	2,409	1,219	50.6	0.62	0.13
Colorado	5,234	3,670	1,655	45.1	0.89	0.12
New Mexico	648	2,512	1,236	49.2	0.65	0.01
GROUP B[2]						
New York	2,009,113	6,019	2,622	43.6	1.43	45.22
Pennsylvania	434,044	3,287	1,725	52.5	0.90	9.77
New Jersey	252,037	3,837	2,045	53.3	1.10	5.67
Illinois	251,318	4,772	2,118	44.4	1.11	5.66
California	188,294	4,871	2,334	47.9	1.28	4.24
GROUP C[3]						
Utah	3,433	2,428	1,289	41.2	0.70	0.08

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

Paper and Allied Products Manufacturing

This industry employed only 268 production workers in the state in 1947. Average value added per production worker, however, was more than twice as great as in the manufacturing of apparel and related products. (Tables 37 and 39). The average hourly wage of $1.01 was almost 20 per cent below the national level, and below that in all states in Groups A and B, except Missouri. The same statement applies to average annual wages, which amounted to $2,205 in Oklahoma.

There were small numbers of workers in miscellaneous manufacturing in Oklahoma in 1947. Data for Oklahoma, the United States, and states in Groups A, B, and C are shown in Tables 40, and 41 but because of the small amounts involved and the great diversity of activity, no further comments seem warranted. Data are also shown for leather and leather products manufacturing (which employed only 15 production workers in Oklahoma in 1947), and for "all other" manufacturing groups in Tables 42-45. The purpose in presenting the data, however, was to provide completeness of coverage rather than detailed analysis.

TABLE 38

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN PAPER AND ALLIED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	382	268	942	591	70.2	62.7
United States	449,833	388,901	1,280,672	1,010,972	86.4	78.9
GROUP A[1]						
Missouri	9,104	7,769	21,896	15,741	85.3	71.9
Texas	4,674	3,850	13,084	10,212	82.4	78.0
Arkansas	3,159	2,779	8,110	6,712	88.0	82.8
Kansas	1,357	1,175	3,827	3,068	86.6	80.2
GROUP B[2]						
New York	65,026	55,806	183,744	141,247	85.8	76.9
Pennsylvania	35,280	30,865	96,337	76,617	87.5	79.5
Ohio	31,674	27,288	93,949	73,969	86.2	78.7
Massachusetts	34,868	29,538	95,915	73,190	84.7	76.3
Wisconsin	28,144	24,290	81,850	65,432	86.3	79.9

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

TABLE 39

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN PAPER AND ALLIED PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	1,994	7,440	2,205	29.6	1.01	0.07
United States	2,874,958	7,393	2,600	35.2	1.19	
GROUP A[1]						
Missouri	41,250	5,310	2,026	38.2	0.98	1.43
Texas	32,992	8,569	2,652	31.0	1.16	1.15
Arkansas	21,887	7,876	2,415	30.7	1.18	0.76
Kansas	12,024	10,233	2,611	25.5	1.15	0.42
GROUP B[2]						
New York	373,557	6,694	2,531	37.8	1.14	12.99
Pennsylvania	205,773	6,667	2,482	37.2	1.12	7.16
Ohio	199,107	7,296	2,711	37.2	1.25	6.92
Massachusetts	190,680	6,455	2,478	38.4	1.11	6.63
Wisconsin	188,733	7,770	2,694	34.7	1.23	6.56

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

TABLE 40

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN MISCELLANEOUS MANUFACTURES IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	317	270	756	571	85.2	75.5
United States	464,420	397,579	1,205,508	920,508	85.6	76.4
GROUP A[1]						
Missouri	8,435	7,220	19,541	14,450	85.6	73.9
Texas	3,284	2,800	7,609	5,743	85.3	75.5
Colorado	1,804	1,557	3,928	3,072	86.3	78.2
Arkansas	841	746	1,488	1,177	88.7	79.1
Kansas	628	524	1,583	1,142	83.4	72.1
New Mexico	305	233	684	374	76.4	54.7
GROUP B[2]						
New York	104,764	89,879	280,796	210,871	85.8	75.1
Illinois	42,569	35,740	116,601	86,784	84.0	74.4
New Jersey	41,126	34,690	115,340	87,589	84.4	75.9
Connecticut	37,660	32,741	107,210	87,507	86.9	81.6
Massachusetts	41,391	32,292	105,734	81,203	85.3	76.8
GROUP C[3]						
Alabama	600	543	1,058	849	90.5	80.2
South Carolina	721	621	1,240	907	86.1	73.1
New Mexico	305	233	684	374	76.4	54.7
Idaho	213	185	521	405	86.8	77.7
District of Columbia	147	116	442	336	78.9	76.0
Arizona	112	96	301	260	85.7	86.4

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 41

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN MISCELLANEOUS MANUFACTURES IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	1,096	4,059	2,115	52.1	1.03	0.05
United States	2,090,168	5,257	2,315	44.0	1.13	
GROUP A[1]						
Missouri	32,608	4,516	2,001	44.3	0.98	1.56
Texas	14,458	5,164	2,051	39.7	0.98	0.69
Colorado	6,204	3,985	1,973	49.5	0.91	0.30
Arkansas	2,432	3,260	1,578	48.4	0.77	0.12
Kansas	2,386	4,553	2,179	47.9	1.05	0.11
New Mexico	1,102	4,730	1,605	33.9	0.82	0.05
GROUP B[2]						
New York	488,046	5,430	2,346	43.2	1.17	23.35
Illinois	202,248	5,659	2,428	42.9	1.18	9.68
New Jersey	199,140	5,741	2,525	44.0	1.19	9.53
Connecticut	177,471	5,420	2,673	49.3	1.25	8.49
Massachusetts	174,304	4,939	2,301	46.6	1.10	8.34
GROUP C[3]						
Alabama	1,455	2,680	1,564	58.4	0.75	0.07
South Carolina	1,382	2,225	1,461	65.6	0.81	0.07
New Mexico	1,102	4,730	1,605	33.9	0.82	0.05
Idaho	918	4,962	2,189	44.1	1.11	0.04
District of Columbia	658	5,672	2,697	51.1	1.34	0.03
Arizona	576	6,000	2,708	45.1	1.39	0.03

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 42

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN LEATHER AND LEATHER PRODUCTS MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	17	15	25	19	88.2	76.0
United States	383,175	348,529	873,566	725,143	91.0	83.0
GROUP A[1]						
Missouri	42,545	39,309	83,140	72,070	92.4	86.7
Texas	1,690	1,470	3,512	2,710	87.0	77.2
Colorado	1,180	986	2,894	2,095	83.6	72.4
Arkansas	1,343	1,264	1,834	1,640	94.1	89.4
Kansas	138	133	273	238	96.4	87.2
New Mexico	17	17	28	28	100.0	100.0
GROUP B[2]						
Massachusetts	70,892	63,702	170,740	138,608	89.8	81.2
New York	69,640	63,104	174,531	145,282	90.6	83.2
Pennsylvania	31,094	28,685	66,000	55,829	92.2	84.6
Missouri	42,545	39,309	83,140	72,070	92.4	86.7
Illinois	28,729	26,209	67,111	56,718	91.2	84.5
GROUP C[3]						
Idaho	14	13	28	22	92.8	88.0
New Mexico	17	17	28	28	100.0	100.0

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 43

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN LEATHER AND LEATHER PRODUCT MANUFACTURING IN THE UNITED STATES, OKLAHOMA, AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)	Value Added in Each State as Per Cent of United States Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	44	2,933	1,267	43.2	0.59	...
United States	1,532,803	4,398	2,081	47.3	1.07	
GROUP A[1]						
Missouri	117,333	2,985	1,833	61.4	1.00	7.65
Texas	5,962	4,056	1,844	45.4	0.92	0.39
Colorado	4,370	4,432	2,125	47.9	1.07	0.28
Arkansas	3,121	2,469	1,297	52.5	0.74	0.20
Kansas	466	3,504	1,789	51.1	0.84	0.03
New Mexico	33	1,941	1,647	84.8	0.93	...
GROUP B[2]						
Massachusetts	326,663	5,128	2,176	42.4	1.15	21.31
New York	293,066	4,644	2,302	49.6	1.17	19.12
Pennsylvania	125,141	4,363	1,946	44.6	0.99	8.16
Missouri	117,333	2,985	1,833	61.4	1.00	7.65
Illinois	114,758	4,379	2,164	49.4	1.13	7.49
GROUP C[3]						
Idaho	54	4,154	1,692	40.7	0.81	...
New Mexico	33	1,941	1,647	84.8	0.93	...

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 44

NUMBER OF EMPLOYEES AND PRODUCTION WORKERS IN ALL OTHER MAJOR INDUSTRY GROUPS MANUFACTURING IN OKLAHOMA AND OTHER SELECTED STATES, 1947*

State	Number of Employees		Wages		Number of Production Workers as Per Cent of Total Employees	Wages of Production Workers as Per Cent of Wages of All Employees
	Total	Production Workers	Total (thousands of dollars)	Production Workers (thousands of dollars)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Oklahoma	2,822	2,534	7,928	6,859	89.8	86.5
GROUP A[1]						
Colorado	6,265	4,721	18,408	13,403	75.4	72.8
New Mexico	715	617	2,239	1,788	86.3	79.8
Kansas	3,272	2,791	8,997	7,295	85.3	81.1
Missouri	3,024	2,664	6,361	5,007	88.1	78.7
Texas	1,553	1,332	3,969	3,225	85.8	81.2
Arkansas	1,832	1,753	2,815	2,671	95.7	94.9
GROUP B[2]						
California	21,642	17,786	66,969	50,725	82.2	75.7
Wisconsin	10,276	8,858	34,189	28,596	86.2	83.6
Tennessee	10,472	9,180	27,562	22,935	87.7	83.2
Colorado	6,265	4,721	18,408	13,403	75.4	72.8
Alabama	6,007	5,384	17,263	14,782	89.6	85.6
GROUP C[3]						
Colorado	6,265	4,721	18,408	13,403	75.4	72.8
Alabama	6,007	5,384	17,263	14,782	89.6	85.6
Mississippi	6,795	6,289	20,458	18,253	92.6	89.2
Kentucky	7,952	7,127	18,558	15,502	89.6	83.5
Illinois	6,087	5,204	16,287	12,723	85.5	78.1
North Carolina	5,502	3,781	13,053	7,007	68.7	53.7
Georgia	4,691	3,994	12,207	9,403	85.1	77.0
Montana	3,662	3,179	10,808	8,983	86.8	83.1½
New Mexico	715	617	2,239	1,788	86.3	79.8
Kansas	3,272	2,791	8,997	7,295	85.3	81.1
Nebraska	3,251	2,876	8,005	6,544	88.5	81.7
South Carolina	4,513	4,025	9,578	7,887	89.2	82.3
Nevada	839	733	2,846	2,379	87.4	83.6
Missouri	3,024	2,664	6,361	5,007	88.1	78.7

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

TABLE 45

VALUE ADDED BY MANUFACTURE AND WAGES OF PRODUCTION WORKERS IN ALL OTHER MAJOR INDUSTRY GROUPS MANUFACTURING IN OKLAHOMA AND OTHER SELECTED STATES, 1947*

State	Value Added by All Employees (thousands of dollars)	Average Annual Value Added Per Production Worker (dollars)	Average Annual Wage Per Production Worker (dollars)	Wages of Production Workers as Per Cent of Value Added	Average Hourly Wage Per Production Worker (dollars)
(1)	(2)	(3)	(4)	(5)	(6)
Oklahoma	26,035	10,274	2,707	26.3	1.26
GROUP A[1]					
Colorado	38,894	8,239	2,839	34.5	1.34
New Mexico	17,756	28,778	2,898	10.1	1.25
Kansas	16,981	6,084	2,614	43.0	1.16
Missouri	14,344	5,384	1,879	34.9	0.96
Texas	10,452	7,847	2,421	30.8	1.09
Arkansas	4,654	2,655	1,524	57.4	0.78
GROUP B[2]					
California	114,770	6,453	2,852	44.2	1.48
Wisconsin	60,802	6,864	3,228	47.0	1.46
Tennessee	59,608	6,493	2,498	38.5	1.23
Colorado	38,894	8,239	2,839	34.5	1.34
Alabama	37,710	7,004	2,746	39.2	1.24
GROUP C[3]					
Colorado	38,894	8,239	2,839	34.5	1.34
Alabama	37,710	7,004	2,746	39.2	1.24
Mississippi	36,202	5,756	2,902	50.4	1.41
Kentucky	34,223	4,802	2,175	45.3	1.11
Illinois	29,657	5,699	2,455	42.9	1.21
North Carolina	27,826	7,359	1,853	25.2	0.92
Georgia	25,620	6,415	2,354	36.7	1.21
Montana	22,021	6,927	2,826	40.8	1.38
New Mexico	17,756	28,778	2,898	10.1	1.25
Kansas	16,981	6,084	2,614	43.0	1.16
Nebraska	16,292	5,665	2,275	40.2	1.07
South Carolina	16,226	4,031	1,959	48.6	0.97
Nevada	16,059	21,909	3,246	14.8	1.41
Missouri	14,344	5,384	1,879	34.9	0.96

*Source: Compiled from data in U. S. Bureau of the Census, Census of Manufactures: 1947, Vols. I and III, (Washington: U. S. Government Printing Office, 1950).

1 States surrounding Oklahoma.

2 States having highest value added in the nation.

3 States having value added 50 per cent above or below Oklahoma.

CHAPTER IX

SUMMARY AND CONCLUSIONS

Oklahoma is not yet a fully industrialized state although in recent decades manufacturing has become an important source of income. Per capita income payments in Oklahoma are substantially below the national average. The cause of lower income payments may be attributed to the lack of industrialization. It is an established fact that industrial growth is the main factor underlying the increase in aggregate commodities and services on which the standard of living of people depends. Despite the fact that Oklahoma has not achieved industrial development comparable to highly industrialized states such as New York, Pennsylvania, Illinois, Ohio, Michigan, New Jersey, and California, a continued trend towards increasing manufacturing activity within the state is evident. Prior to 1900 manufacturing accounted for only a fraction of Oklahoma's total economic activity, and the people were largely dependent on agriculture.

Since the discovery of petroleum during the early years of the present century Oklahoma has come to be one of the important mining states in the nation. In 1951 Oklahoma

ranked 6th in mineral production throughout the United States; and petroleum alone accounted for 79 per cent of the total mineral value in the state. It is, thus, by virtue of petroleum that Oklahoma is classified an important mineral state.

In Oklahoma 4 out of 15 manufacturing industries, (petroleum, food, machinery, and printing and publishing) are important in terms of value added by manufacture. These four account for about two-thirds of the total value added in all manufacturing industries in Oklahoma. The remaining 11 manufacturing industries, including "all other" major industry groups, represent approximately one-third of the total value added in all manufacturing industries in the state. In general, the four major manufacturing industries account for about two-thirds of the other items, such as number of manufacturing establishments, total number of employees, total number of production workers, total wages and salaries of all employees, and wages and man-hours of production workers in the state.

Petroleum is the most important manufacturing industry in Oklahoma on the basis of total value added by manufacture. In crude oil production Oklahoma ranks 4th in the nation, surpassed only by Texas, California, and Louisiana; but in manufacturing of petroleum Oklahoma ranks 9th from the top. This indicates that manufacturing of petroleum in the state

is relatively less important than its production in crude form.

Measured in terms of average annual value added per production worker, petroleum ranks considerably higher than each of the other manufacturing industries in Oklahoma. It is almost twice as high as in food, which is the second most important manufacturing industry in the state. Similarly the average annual wage per production worker in petroleum is higher than in each of the remaining manufacturing industries in Oklahoma. This is also true of average hourly wages of production workers in petroleum relative to the other manufacturing industries. Although total value added in petroleum in Oklahoma is only 4 per cent of the total value added in the United States, average annual value added per production worker in Oklahoma was about 6 per cent above the national average.

Average annual value added per production worker in Oklahoma is relatively higher than the national average, but the average annual wage per production worker in Oklahoma ranks below the average for the nation. In Oklahoma the average annual wage per production worker in petroleum was about 8 per cent lower than the national average. Similarly, Oklahoma's hourly wage in petroleum was 8 per cent below the average for the United States.

Food is Oklahoma's second most important manufacturing

industry, on the basis of value added. The number of establishments in this industry is larger than in any other manufacturing industry in the state. It also employed more workers and paid a larger total of wages and salaries in 1947 than any other manufacturing industry. Although it ranks high among the state's manufacturing industries, it accounts for something less than one per cent of the national total. Average annual value added per production worker was below the national average, and the hourly and average annual wage were also below that for the nation. Average annual value added per production worker in petroleum was almost twice as great as in food manufacturing. Hourly wage rates and average annual wages of production workers in petroleum manufacturing were about 50 per cent above those in food manufacturing in Oklahoma.

Machinery (except electrical) is the third most important manufacturing industry in Oklahoma. In 1947 this industry employed about 5,000 production workers, 11 per cent of the total employed in all manufacturing industries in the state. Value added by manufacture in machinery in Oklahoma was about one half of one per cent of the national total. As was the case in petroleum manufacturing, average annual value added per production worker in Oklahoma was above the national average. It was higher than in food manufacturing in the state, but far below that in petroleum manu-

facturing. Hourly wage rates and average annual wages of production workers were well below the national average. They were, however, higher than in the state's food manufacturing industry.

Printing and publishing, the fourth most important manufacturing industry in Oklahoma, accounted for about 8 per cent of total value added in all manufacturing industries in the state. In 1947 this industry employed 3,000 production workers. Most printing and publishing firms in the state were small and employed less than 20 production workers each. Oklahoma accounted for one half of one per cent of the national total for this industry. Value added per production worker in Oklahoma was well below the national average, as were hourly and average annual wages of production workers. Hourly and average annual wages of production workers were higher than in the state's food manufacturing industry, but lower than in machinery and petroleum.

In two of the state's four most important manufacturing industries (petroleum and machinery) average annual value added per production worker was above the national average. In food manufacturing and printing and publishing, average value added was lower. In all four industries, however, hourly wage rates and average annual wages of production workers were below the national average. Average annual wages of production workers were 50 per cent higher

in petroleum manufacturing in Oklahoma than in food manufacturing. In petroleum manufacturing average value added was the highest of any of the state's manufacturing industries. So too were hourly and average annual wages. Value added per production worker was lowest in food manufacturing (among the four important industries). So too were hourly and average annual wages of production workers.

There were 11 other manufacturing industries in Oklahoma in 1947 for which comparable data were available. They were stone, clay and glass products; fabricated metal products; primary metal products; chemicals and allied products; lumber and products (except furniture); transportation equipment; furniture and fixtures; apparel and related products; paper and allied products; miscellaneous manufactures; and leather and leather products. These industries, together with the miscellaneous group classified as "all other major" industries, accounted for about a third of the manufacturing activity in the state. All of these industries were small and each of them accounted for only a fraction of one per cent of the national total.

In three of these industries (stone, clay, and glass products; fabricated metal products; and paper and allied products) average annual value added per production worker was above the national average. In the other eight groups it was below the national level. In all 11 industry groups,

however, average hourly wage rates and average annual wages per production worker were below the national level.

Among the entire 15 manufacturing groups for which comparable data are available, average annual value added per production worker in Oklahoma was above the national level in five (petroleum and coal products; machinery, except electrical; and the three industries mentioned in the preceding paragraph). In all 15 groups, however, hourly and annual wages in Oklahoma were below the national levels.

One of the most significant conclusions which emerges from the preceding analysis of manufacturing activity in Oklahoma is that there was no fixed relationship between hourly or annual wage rates and value added per worker. The variation was substantial whether comparison was made with surrounding states, states in which the particular type of manufacturing was relatively very important, or with states in which the particular type of manufacturing was about as important as it was in Oklahoma.

A second conclusion which is equally clear and perhaps of equal importance is that there is no fixed relationship between total wages paid production workers and total value added by manufacture. Everywhere there was considerable variation. This generalization applies to ratios of wages to value added among different states in the same manufacturing industries in the same state. The data suggest clearly that

average annual value added is not the principal determinant of average annual wages of production workers.

In most industries for which data were available, it seems that the principal determinant of average annual wages of production workers was the hourly wage rate. In general in those industries in which average hourly wages were high, annual average wages tended to be high. On the other hand, when hourly wages were low, average annual wages tended to be correspondingly low. There were, however, important exceptions.

In some industries an important factor contributing to high or low average annual wages was the relationship between wages of production workers and total value added by manufacture. In those industries in which employers paid workers a relatively high percentage of value added, average annual wages tended to be high. When production workers received a relatively small percentage of value added, average annual wages tended to be low.

Although hourly and average annual wages of production workers were lower than the national average in all 15 manufacturing industries, they were not noticeably below those in the surrounding states or the Group C states (those in which the particular manufacturing industry was within a range of 50 per cent above or below that in Oklahoma). But hourly and annual wages of production workers were usually

well below those in the Group B states (states in which the particular manufacturing industry was relatively important.)

It is beyond the scope of this study to isolate the factors that account for variations in hourly wage rates in the different manufacturing industries of the state. On the basis of available data it is not possible to indicate the relative importance of such factors as the extent of unionization in the various industries, the extent of collective bargaining, wage rates prevailing in the region, variations in skill, type of machinery, and other factors.

BIBLIOGRAPHY

Books

Bell, John Fred. A History of Economic Thought. New York: The Ronald Press Company, 1953.

Bell, Spurgeon. Productivity, Wages, and National Income. Washington: The Brookings Institute, 1940.

Dewhurst, J. Frederic and Associates. America's Needs and Resources. New York: The Twentieth Century Fund, 1947.

Fabricant, Solomon. Employment in Manufacturing, 1899-1939. New York: National Bureau of Economic Research, 1942.

_____. The Output of Manufacturing Industries, 1899-1937. New York: National Bureau of Economic Research, 1940.

Steiner, Peter O. and Goldner, William. Productivity. Berkeley: Institute of Industrial Relations, 1952.

Stigler, George J. Trends in Output and Employment. New York: National Bureau of Economic Research, 1947.

Woytinsky, W. S. and Associates. Employment in the United States. New York: The Twentieth Century Fund, 1953.

Public Documents

U. S. Bureau of Labor Statistics. Concepts and Measurements of Production and Productivity. Irving H. Siegel's summary of doctoral dissertation mimeographed by the U. S. Bureau of Labor Statistics, 1952.

U. S. Bureau of Labor Statistics. Employment and Earnings. Annual Supplement Issue, May, 1954.

U. S. Bureau of Labor Statistics. Progress and Status of Productivity Measurement in the U. S. A mimeographed paper presented by Samuel Weiss at the 28th Session, International Statistical Institute, Rome, Italy, September 6-12, 1953.

U. S. Bureau of Labor Statistics. Relationship between Productivity Measurements. (Date of publication not given).

U. S. Bureau of the Census. Census of Manufactures: 1947. Vols. I, II, and III, Washington: U. S. Government Printing Office, 1950.

U. S. Bureau of the Mines. Mineral Yearbook, 1951. Washington: U. S. Government Printing Office, 1954.

U. S. Department of Commerce. Survey of Current Business. (August 1954).

Periodicals

Davis, John C. and Hitch, K. Thomas. "Wages and Productivity." The Review of Economics and Statistics. Vol. XXXI, (November 1949), pp. 292-298.

Fabricant, Solomon. "Of Productivity Statistics: An Admonition." The Review of Economics and Statistics. Vol. XXXI, (November 1949), pp. 309-311.

Hamm, Clyde E. "Petroleum Plays Big Role in Oklahoma's Economy." World Oil. (February 1, 1952), pp. 40-66.

Kerr, Clark. "Short-run Behavior of Physical Productivity and Average Hourly Earnings." The Review of Economics and Statistics. Vol. XXXI, (November 1949), pp. 299-309.

"U. S. Crude Oil Production." World Oil. (February 15, 1954), pp. 149-150.

Miscellaneous

Anglo-American Council on Productivity. Productivity Measurements in British Industries. (November 1950).

"Economics of Growth and Development: The New Economics?" title of paper by Clarence E. Ayres, at the annual meeting of the Southwestern Social Sciences Association, Dallas, Texas, April 8, 1955.

Mills, Frederick C. Productivity and Economic Progress. New York: National Bureau of Economic Research, 1952.

Organization for European Economic Cooperation. Measurement of Productivity. Paris: OEEC, 1952.