Economic Series
Monograph Number Three

REGIONAL PLAN OF NEW YORK AND ITS ENVIRONS

ECONOMIC AND INDUSTRIAL SURVEY

THE FOOD MANUFACTURING INDUSTRIES

WILLIAMS

Price, Seventy-five Cents

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AND ITS ENVIRONS
130 East 22d Street, New York

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ROBERT MURRAY HAIG, *Director*
ROSWELL C. MCCREA, *Consultant*

THE FOOD MANUFACTURING INDUSTRIES IN NEW YORK AND ITS ENVIRONS

PRESENT TRENDS AND PROBABLE FUTURE DEVELOPMENTS

By
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REGIONAL PLAN OF NEW YORK
AND ITS ENVIRONS
130 EAST 22D STREET, NEW YORK
1924

REGIONAL PLAN OF NEW YORK AND ITS ENVIRONS

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FOREWORD

The Committee on the Regional Plan of New York and Its Environs contemplates the making of a comprehensive regional plan for an area of about 5,528 square miles with a resident population approaching 9,000,000. This region is unique, not only in extent of area and density of buildings and population, but also in the variety and complexity of its physical, economic and social conditions. The problems that have to be dealt with in making the Plan are unprecedented in their character and scale. The general object to be sought in dealing with these problems is to make more adequate provision than has hitherto been made for efficiency and convenience in connection with all forms of industry and business, and for health and amenity in connection with living conditions.

The first part of the task of making the Plan consists of a survey of all conditions that have an important bearing on the development of the region. A survey of many of the existing physical features has already been made and the results shown on maps. The present use and the adaptability for future use of lands within the region have been the subject of much study. Progress has been made in the investigation of the problems of transit, transportation and traffic. Studies of social conditions, in particular those relating to housing, recreation facilities and public health, have been pursued and valuable data have been accumulated. Legal and administrative problems have been investigated. Architectural and engineering features have been considered and tentative plans formulated for dealing with specific problems. All these surveys are important in their relation to the general plan to be prepared, but probably none is more so than the Economic and Industrial Survey which deals in this Monograph with one of a group of industries that have been the subject of special study.

An investigation of economic conditions is essential as a preliminary in preparing a regional plan. Such a plan should be based on a knowledge of the factors that promote or retard material welfare and on the recognition, that comes from that knowledge, of the true economic standards that should guide the regional planner in his operations.

This survey, as well as each of the others that have been made, may have considerable value in itself as a contribution to knowledge of conditions and tendencies in the New York region. The greatest value, however, of all these inquiries will come after each survey has been studied in relation to all other surveys, and the whole mass of information co-ordinated as one comprehensive study of the physical, economic, social, legal and administrative problems of the region.

THOMAS ADAMS
General Director of Plans and Surveys

TABLE OF CONTENTS

TABLES IN TEXT

DIAGRAMS

OUTSTANDING FACTS REVEALED BY THE INVESTIGATION

THE food manufacturing industries of New York and its environs required the services of 82,472 workers in 1922, an increase of 70.7 per cent since 1900. This increase coincides closely with the increase in the population during this period (page 12).

THE annual product of the industry is estimated at approximately 1⅛ billion dollars (page 15).

FOOD manufacturing plants are seeking cheaper sites. In 1917 there were five food plants on land valued at more than $5,000 per front foot. In 1922 there was only one. In 1917 there were 44 plants on land worth from $1,000 to $5,000 per front foot. In 1922 there were only 25 (page 53).

APPROXIMATELY one-half of all the raw sugar brought into the United States is refined about New York harbor. The amount refined here continues to grow but New York's share of the total refining of the country is much less than was formerly the case (page 18).

THE future growth of sugar refining in the area appears to depend principally upon the future increase of consumption in the territory for which New York forms a convenient distributing point (page 19).

NEW YORK appears to be declining both absolutely and relatively as a coffee importing and roasting center (page 38).

NEW YORK'S share of the coffee roasting and tea packing may be expected to continue to decline and the plants will tend to locate near the waterfront of Long Island and New Jersey (page 39).

ONE-FOURTH of the chewing gum of the country is produced in New York City (page 32).

CANDY factories, which have a large and fluctuating demand for female labor, tend to cling to locations near the center of the metropolitan area. In spite of this there is a movement of appreciable strength from the center toward the periphery of the region (page 33).

NEW YORK CITY, with 9 per cent of the population of the country, produced more than 15 per cent of the bakery products of the country (page 25).

THE average bakery is small but is increasing in size. The number of bakeries in the three states of New York, New Jersey, and Connecticut employing more than 100 wage-earners nearly doubled in the ten years, 1909 to 1919 (page 27).

THE trend in the field of bread bakeries appears to be in the direction of plants with from 50 to 150 employes located with reference to convenience of delivery to residence sections. Such plants move outward with population, rather than ahead of it (page 58).

IN spite of the restrictions imposed by the law of 1913, 3,077 cellar bakeries still persist in New York City (page 29).

IT seems probable that biscuit and cracker bakeries in New York will in the future produce for a less wide market than they do at the present time. Such establishments will cling to the center of the area as long as the present radial system of transportation persists (page 57).

NEW YORK is one of the large slaughtering centers of the country, ranking next after Chicago and Kansas City in the number of cattle and calves butchered (page 20).

MORE than 60 per cent of all the slaughtering in the area is done on Manhattan Island. This is a much smaller percentage than was formerly done there. The total amount of slaughtering in the entire area remained practically stationary between 1914 and 1919 (page 24).

THE future of beef slaughtering in the area depends largely upon the future of the Kosher demand. Improvement of transportation facilities to New Jersey and Long Island should make possible the transfer to Zone II of the slaughtering now done on Manhattan (page 22).

MANHATTAN south of 59th Street has only 181 large food plants (20 or more employes) as compared with 230 in 1917 (page 44).

ON Manhattan Island south of 59th Street the number of food plants employing 100 or more workers was the same in 1922 as in 1900 (39 plants). During this period such plants in the rest of the area increased from 37 to 85 (page 44).

IN general there appear to be only two groups of plants which will tend to cling closely to locations at the very center of the area: one, those which required a large and fluctuating number of dependent wage-earners and, two, those which gain a great advantage in distribution by remaining there (page 60).

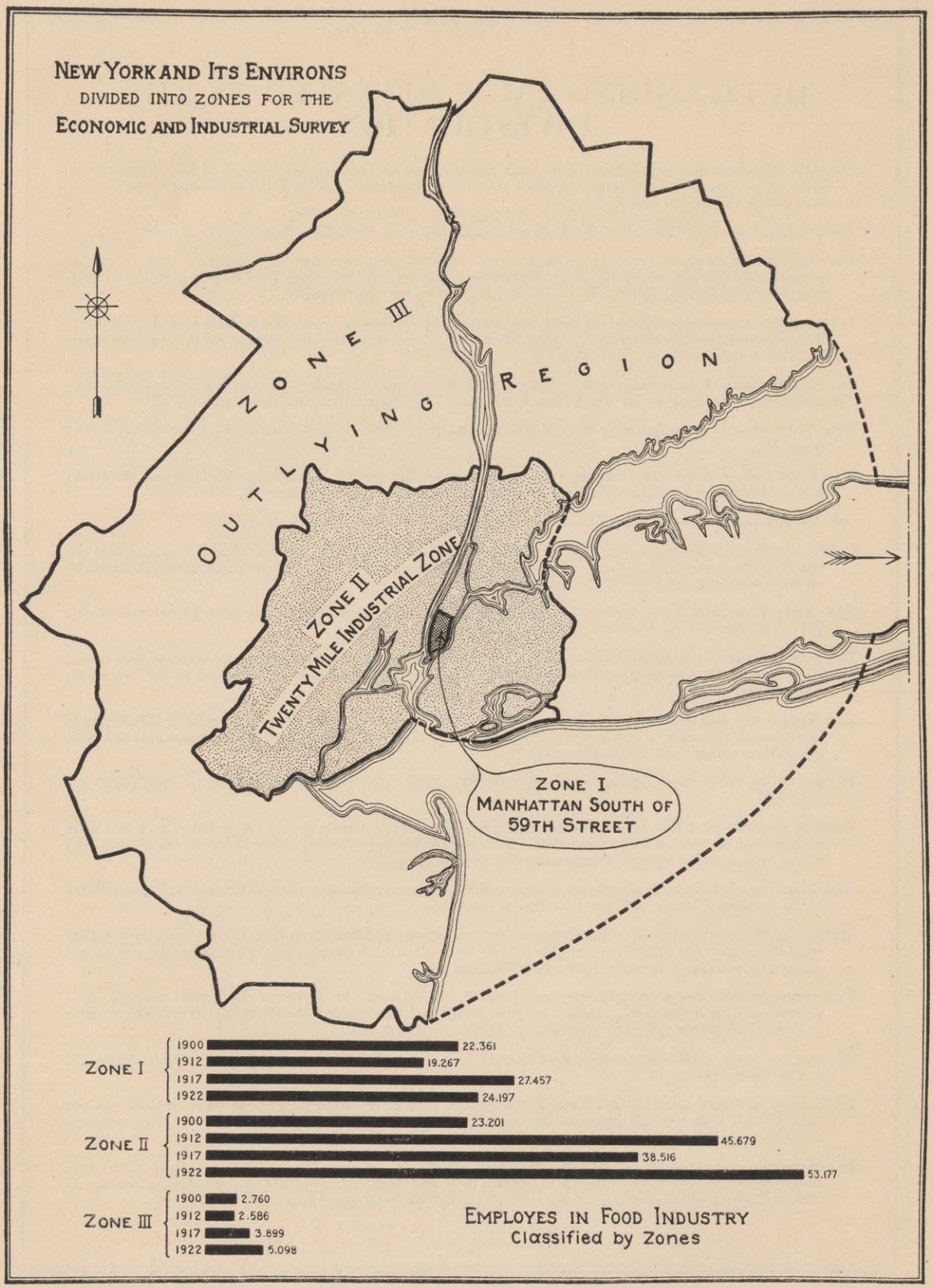

NEW YORK AND ITS ENVIRONS
DIVIDED INTO ZONES FOR THE
ECONOMIC AND INDUSTRIAL SURVEY
ZONE III
OUTLYING REGION
ZONE II
TWENTY MILE INDUSTRIAL ZONE
ZONE I
MANHATTAN SOUTH OF
59TH STREET
ZONE I
1900 22.361
1912 19.267
1917 27.457
1922 24.197
ZONE II
1900 23.201
1912 45.679
1917 38.516
1922 53.177
ZONE III
1900 2.760
1912 2.586
1917 3.899
1922 5.098
EMPLOYES IN FOOD INDUSTRY
Classified by Zones

DIAGRAM I

INTRODUCTION

This monograph presents certain facts regarding the food manufacturing industries in New York and its environs which have a bearing upon the problem of planning the area. It is one of a series of twelve similar monographs, a complete list of which appears at the end of this pamphlet. It is published in the hope that it will be of interest not merely to professional city planners but to several other groups as well: first, to the food manufacturing industries because the facts regarding trends in the industries should aid in arriving at sound decisions on questions of location; second, to city officials, utility companies, chambers of commerce, real estate men and others interested in the development of various sections of the metropolitan area because of the hints it gives regarding the character of the development for which the area appears to be destined; and third, to economists and to citizens generally because of the light it throws upon the vexed problem of urban land utilization.

Purpose of the Investigation

The investigation was undertaken primarily to supply an economic foundation for a comprehensive plan of New York and its environs. The determination of the width of streets and the size of blocks, the provision of transportation facilities, bridges, and tunnels, the establishment of restricted zones, the reservation of open spaces, and many other problems of the regional planner must rest upon assumptions regarding the economic character of the uses to which the various sections of the area are to be devoted. To ask the city planner to construct a plan without making such assumptions is much like asking an architect to design a structure without knowing whether it is to be used as a cathedral or a locomotive plant. To increase the accuracy of these necessary assumptions was the essence of the problem of the Economic and Industrial Survey.

Scope and Method

Obviously the problem here is not susceptible of a precise solution. The most promising way to gain an idea of the future economic characteristics of New York and its environs seemed to be to study (1) New York as it now is, (2) the changes which have recently been taking place, and (3) the forces which are causing those changes, their character, strength, and probable persistence. In other words, it was necessary to gather significant data, to analyze those data in the light of the recent past in the hope of discovering trends, to appraise these trends, and to draw any conclusions which might appear to be justified. In gathering the facts and in analyzing them it seemed advisable in most cases to proceed by industries or types of economic activity rather than by subdivisions of the area. The most important single source of information proved to be the records of the factory inspection departments of the three states, New York, New Jersey, and Connecticut, into which the area under study extends. A card was prepared showing the character, location, and the number of employes of each industrial establishment in the area for each of the four years 1900, 1912, 1917, and 1922.[1] These data furnished the chief source of information for nine of the twelve studies undertaken, those dealing with the various industries.[2]

The industries selected for intensive study were chosen on the basis of their size and their importance from the point of view of the character of their space demands. Clothing and metals employing roughly a quarter of a million workers each obviously demanded attention, and it seemed advisable to study men's clothing separately from women's clothing. The manufactures of food, textile, chemical, and wood products were all industries which employed more than 50,000 workers. Printing and tobacco were both relatively small industries, but were selected nevertheless because of the importance of the trends revealed by a preliminary survey. The industries which were not studied were either relatively unimportant in size (e. g., power),

[1] Originally the plan was to use the year 1907 in place of 1900, thus making all the intervals five years in length. A lack of records for 1907, however, made it necessary to use the year 1900 instead.

[2] The staff of the Economic and Industrial Survey desires to record its thanks to the officials in the labor departments in these states for the assistance they have rendered in making available these records, often at the cost of considerable personal inconvenience. The New York data for 1900 were transcribed from the *Annual Report of the Factory Inspector* and for 1912 from the *Industrial Directory.*

essentially similar to other industries which were studied (e. g., millinery and miscellaneous sewing as compared with clothing), or of a local service character whose space demands were to a large degree a mere function of population (e. g., laundries, cleaning and dyeing). Altogether the nine industrial studies covered 71.9 per cent of all of the plants and 79.5 per cent of all of the employes listed by the factory inspectors for the area.

In addition to the nine industrial studies, investigations were made of the financial district, the wholesale markets, and the retail shopping districts. The sources of information for these studies, which were widely scattered, are described in the monographs dealing with these topics.

After the factory records had been transcribed and sorted by industries, they were distributed among the investigators. Each investigator first worked out the particular classification of the industry, the particular subdivisions of area into sections, and the particular frequency groups of employes which were most promising for the purposes of the analysis in hand. The cards were then classified according to branch of industry, section of area, and size of plant as measured by number of employes.[1] All of this information was tabulated and mapped. The character of the maps can be seen from those reproduced on pages 16 and 17 of this monograph. They were prepared on transparent sheets, which could be superimposed on colored land-value maps in such a manner that a count of the symbols yielded data regarding the value of the land occupied by the plants.

The analysis of these data in every case yielded suggestions regarding trends of possible significance, and the investigators, by means of interviews with authorities in the various industries, proceeded to check the information and to inquire into the forces lying back of the growth and decline indicated by the statistics. The monographs now presented are the reports of the findings of the investigators.

As has been pointed out, each investigator was permitted to subdivide the area in the manner best adapted to the analysis of his particular problem. However, for purposes of general comparisons it was found desirable to adopt a standard subdivision of the territory into the three zones shown on the map on page 12.[1] All of the factory inspection data, including that not made the subject of special investigation, were sorted according to these three zones as well as by branch of industry, political subdivision, and size of plant as measured by number of employes. Tables setting forth these facts in detail are available at the offices of the Regional Plan of New York and Its Environs. The diagram at the bottom of the map on page 12 shows the number of food employes in each of the three zones for each of the four years.

Criticisms and Suggestions

The monographs are presented in this particular form partly because of the opportunity it affords for criticisms and suggestions. It is hoped that the pamphlets will be considered tentative working papers rather than final products. The type is being held and readers are urged to communicate their comments and corrections in order that these may be utilized in possible future editions and be available for use in the general volume which is now in course of preparation.

ROBERT MURRAY HAIG
ROSWELL C. MCCREA

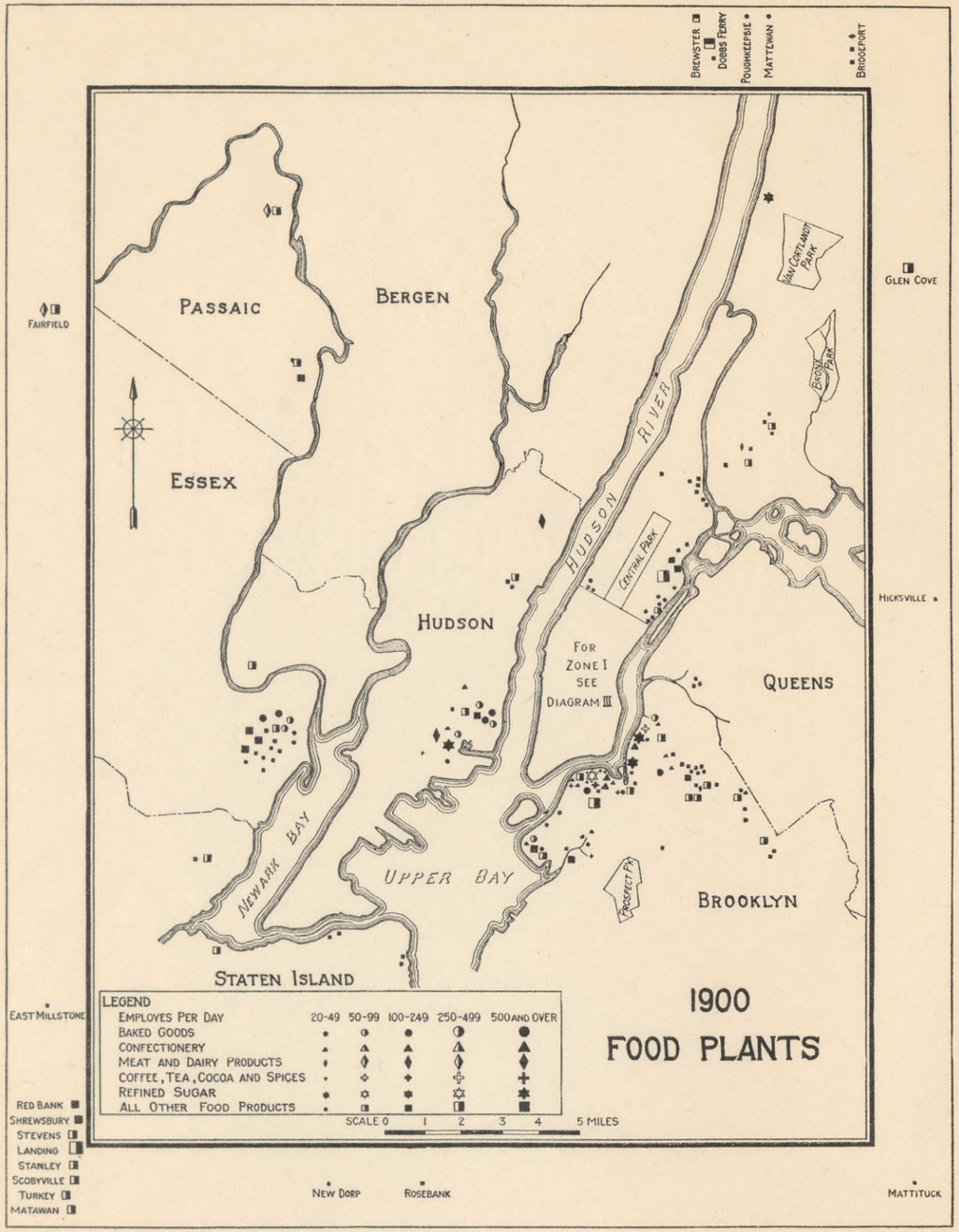
COLUMBIA UNIVERSITY
May 15, 1924.

[1] The records of the departments of labor are not always entirely accurate. Comparisons among the small plants especially are often rendered difficult or impossible because of the incompleteness of the data. Thus in the case of food, the records of the small establishments in Connecticut and New Jersey for the years 1900 and 1912 are obviously defective. The corresponding figures for New York City are more satisfactory.

Unfortunately the number of employes as given in the factory inspection records does not represent the average number of persons employed during the year, but the number in the factory at the time of the visit of the factory inspector. In a seasonal industry this may involve a wide margin of error. In general it has been found, however, that the figures are sufficiently accurate for the purpose of classifying the plants into groups according to the number of persons employed.

As census statistics are used to a considerable extent in this monograph, it should be remembered that the 1919 census included all establishments for the areas indicated which reported products worth $500 or more, while the 1921 census (unless it is otherwise stated) included only those reporting products worth $5,000 or more.

[1] Miss Williams found this standard subdivision well suited to the purposes of the food study, and in this monograph, consequently, there is no special subdivision of the area.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POUGHKEEPSIE
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BRIDGEPORT
GLEN COVE
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CENTRAL PARK
VAN CORTLANDT PARK
BRONX PARK
HICKSVILLE
FOR ZONE I SEE DIAGRAM III
QUEENS
NEWARK BAY
UPPER BAY
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LEGEND
EMPLOYES PER DAY 20-49 50-99 100-249 250-499 500 AND OVER
BAKED GOODS
CONFECTIONERY
MEAT AND DAIRY PRODUCTS
COFFEE, TEA, COCOA AND SPICES
REFINED SUGAR
ALL OTHER FOOD PRODUCTS
SCALE 0 1 2 3 4 5 MILES
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SHREWSBURY
STEVENS LANDING
STANLEY
SCOBYVILLE
TURKEY
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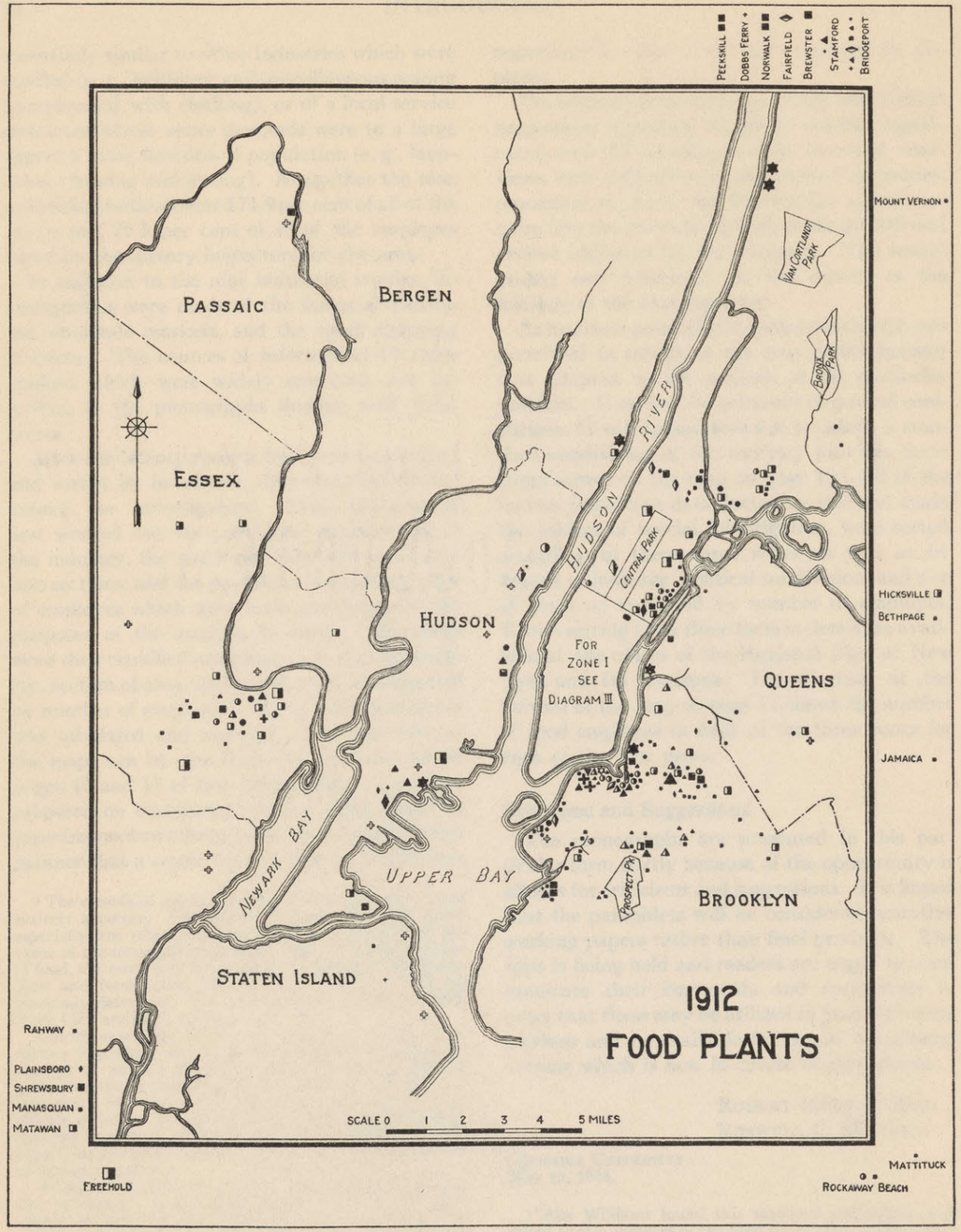
NEW DORP
ROSEBANK
MATTITUCK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FOOD PLANTS
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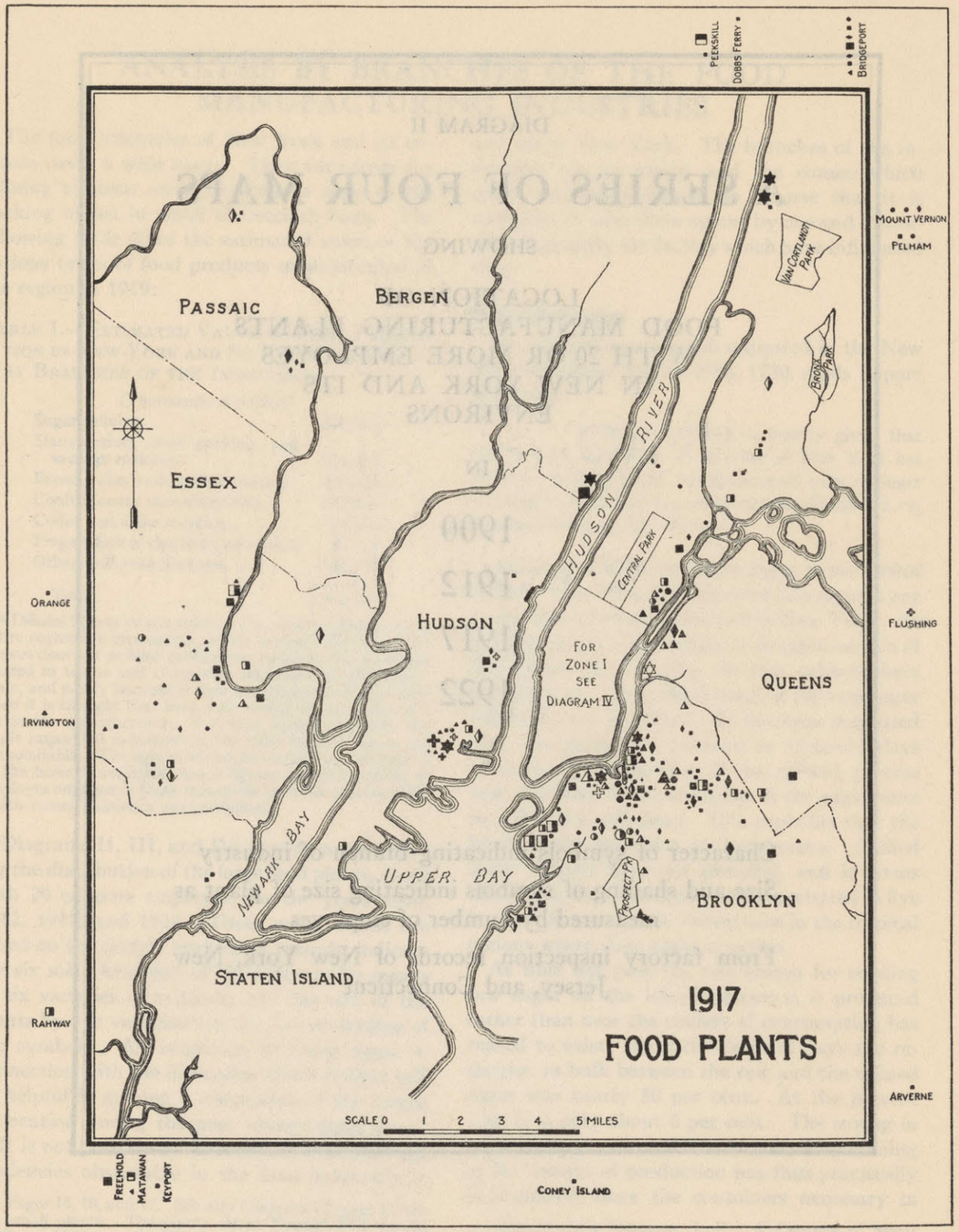
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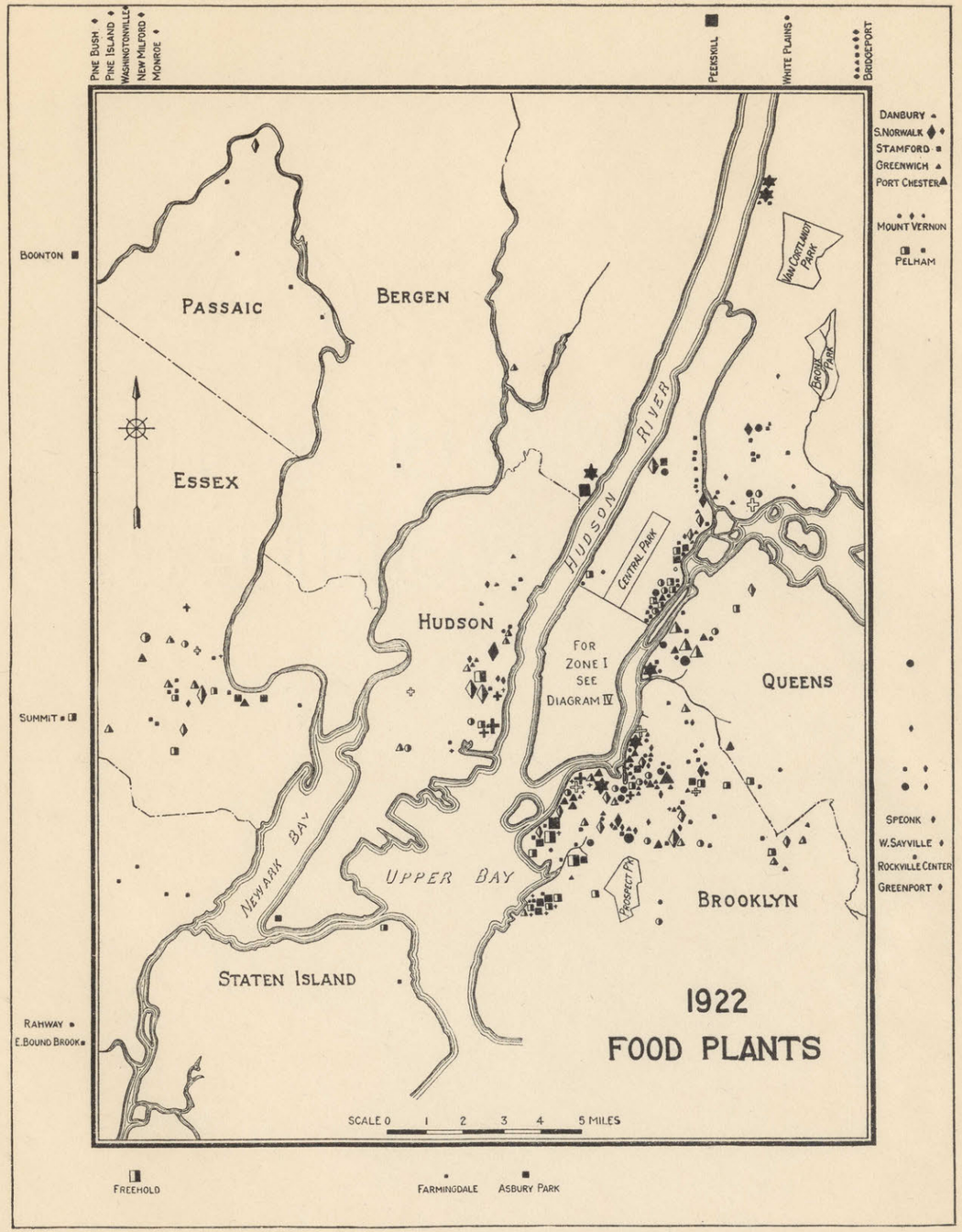
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PEEKSKILL
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ROCKVILLE CENTER
GREENPORT
RAHWAY
E.BOUND BROOK
1922
FOOD PLANTS
SCALE 0 1 2 3 4 5 MILES
FREEHOLD
FARMINGDALE
ASBURY PARK

DIAGRAM II

A SERIES OF FOUR MAPS

SHOWING

LOCATION OF
FOOD MANUFACTURING PLANTS
WITH 20 OR MORE EMPLOYES
IN NEW YORK AND ITS
ENVIRONS

IN

1900

1912

1917

1922

Character of symbols indicating branch of industry

Size and shading of symbols indicating size of plant as measured by number of employes

From factory inspection records of New York, New Jersey, and Connecticut

ANALYSIS BY BRANCHES OF THE FOOD MANUFACTURING INDUSTRIES

The food industries of New York and its environs cover a wide range. They vary from the refining of sugar on a tremendous scale to the packing of tea in small cheesecloth bags. The following table gives the estimated value of the various types of food products manufactured in the region in 1919:

TABLE I.—ESTIMATED VALUE OF FOOD PRODUCTION IN NEW YORK AND ITS ENVIRONS IN 1919, BY BRANCHES OF THE INDUSTRIES[a]

(Thousands of dollars)	
Sugar refining	366,112
Slaughtering, meat packing, and sausage making	324,116
Bread, cake, and cracker making	257,684
Confectionery manufacturing	119,014
Coffee and spice roasting	88,478
Preparation of chocolate and cocoa	33,119
Other food manufactures	194,798
Total	1,383,321

[a] Official figures on the value of the foods produced in the entire region are incomplete, partly because the Bureau of Census does not publish production statistics for industries located in towns and cities with less than 10,000 inhabitants, and partly because it does not publish such statistics when it is thought that they may reveal the activities of a particular manufacturer. For that reason statistics for single important industries in the cities of New Jersey are not available. The figures in the above table are estimated on the basis of available census figures and the number of employes engaged in those industries in towns and cities for which census statistics are published.

Diagrams II, III, and IV[1] present maps showing the distribution of the large food plants, those with 20 or more employes, for the years 1900, 1912, 1917, and 1922. These maps, which are based on the factory inspection records, indicate the six main branches of the industry by means of six varieties of symbols, and the size of the plants by five variations in the size or shading of the symbols. An inspection of these maps in connection with the discussion which follows will be helpful in gaining a conception of the trends in location during the past twenty-three years.

It is not possible to characterize briefly all the tendencies observable in the food industries in and about New York. The branches of the industries are so varied and the causes which affect their development so diverse that it is necessary to take them up one by one and to consider separately the factors which have influenced them.

[1] Pages 15, 16, and 17. See also Diagram VI, page 42, for the small plants. The plants about Newark Bay on the 1900 and 1912 maps in Diagram II are arbitrarily placed.

Sugar Refineries

An advertisement which appeared in the New York *Gazette* on August 17th, 1730, reads in part as follows:

> PUBLIC NOTICE is hereby given that NICHOLAS BAYARD of the City of New York has erected a Refining House for Refining all sorts of Sugar and Sugar-Candy and has procured from Europe an experienced artist in that Mystery . . . . .[1]

Reasons for Refining Cuban Sugar in the United States.—The refining of imported raw sugar is one of the oldest industries located in New York. At this distance it is impossible to be quite certain of the reasons for locating the first refinery here instead of in Cuba, where most of the raw sugar refined here is produced. It has been suggested that transportation methods in Colonial days necessitated the location of the refining process near the home of the consumer if the sugar were to arrive dry and clean. It is probable that the labor factor was also of importance. Skilled sugar refiners were not plentiful, and it seems likely that, being European, they preferred to live in a temperate climate rather than in the tropical regions where cane sugar is grown.

As time has gone on, one reason for refining raw sugar on the islands where it is produced rather than near the centers of consumption has ceased to exist. In early Colonial days the reduction in bulk between the raw and the refined sugar was nearly 50 per cent. At the present time it is only about 6 per cent. The saving in shipping space which would be gained by refining at the centers of production has thus practically disappeared, since the containers necessary in

[1] Quoted from Freeman, J. E.: A Century of Sugar Refining in the United States, page 6.

shipping refined sugar would absorb this 6 per cent advantage.

In addition, sugar refining under modern methods consumes large amounts of coal. It was estimated in 1920 that sugar refineries in the United States consume almost two million tons of coal a year.[1] Cuba and the other islands of the West Indies are notably deficient in their supply of coal.

The United States is also the source of the containers in which refined sugar is sent to the consumer. Wooden barrels, cotton bags, and pasteboard cartons cannot be produced as economically in Cuba as in the United States.

When these factors are considered, in connection with the added fact that it is extremely difficult to secure factory labor of the type necessary for sugar refining in Cuba, it seems reasonable to conclude that the cities of the eastern seaboard of the United States are logical places in which to refine the sugar produced in the West Indies.

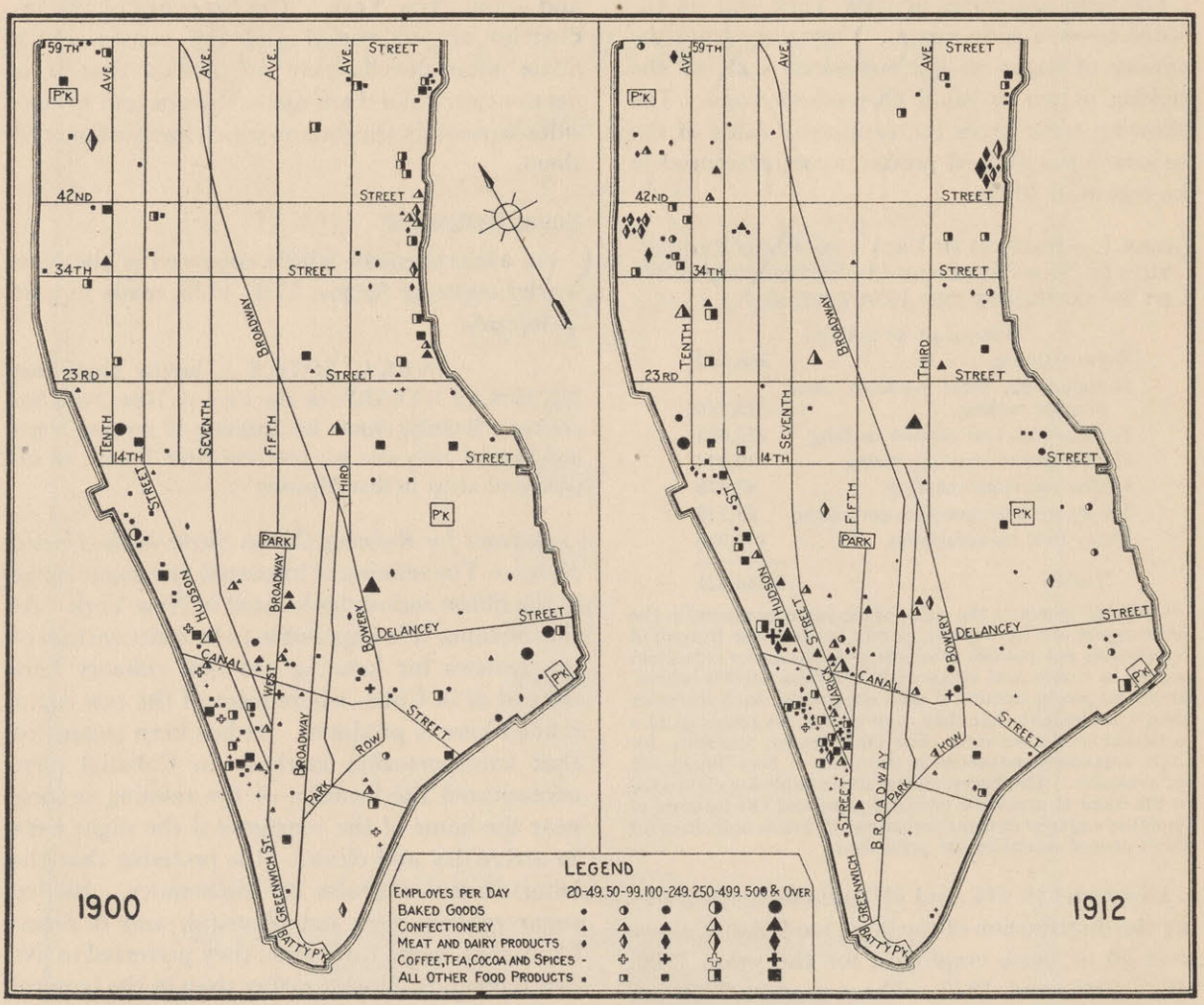

DIAGRAM III

Location of food plants with 20 or more employes on Manhattan Island South of 59th Street in 1900 and 1912

Place of New York in Sugar Refining.—Census statistics as to the growth of the sugar refining industry in the vicinity of New York harbor are extremely unsatisfactory, since the census does

[1] Baltimore Welcomes the American Sugar Refining Company, speech of Earl D. Babst, pages 26 and 28.

not give figures on the operation of the two sugar refineries located in New Jersey.[1] The development of sugar refining on the New York side of the harbor has been as follows:

During 1918 and 1919, however, complete records were published giving the production of every refinery in the country. In those years sugar refineries in the United States were sending

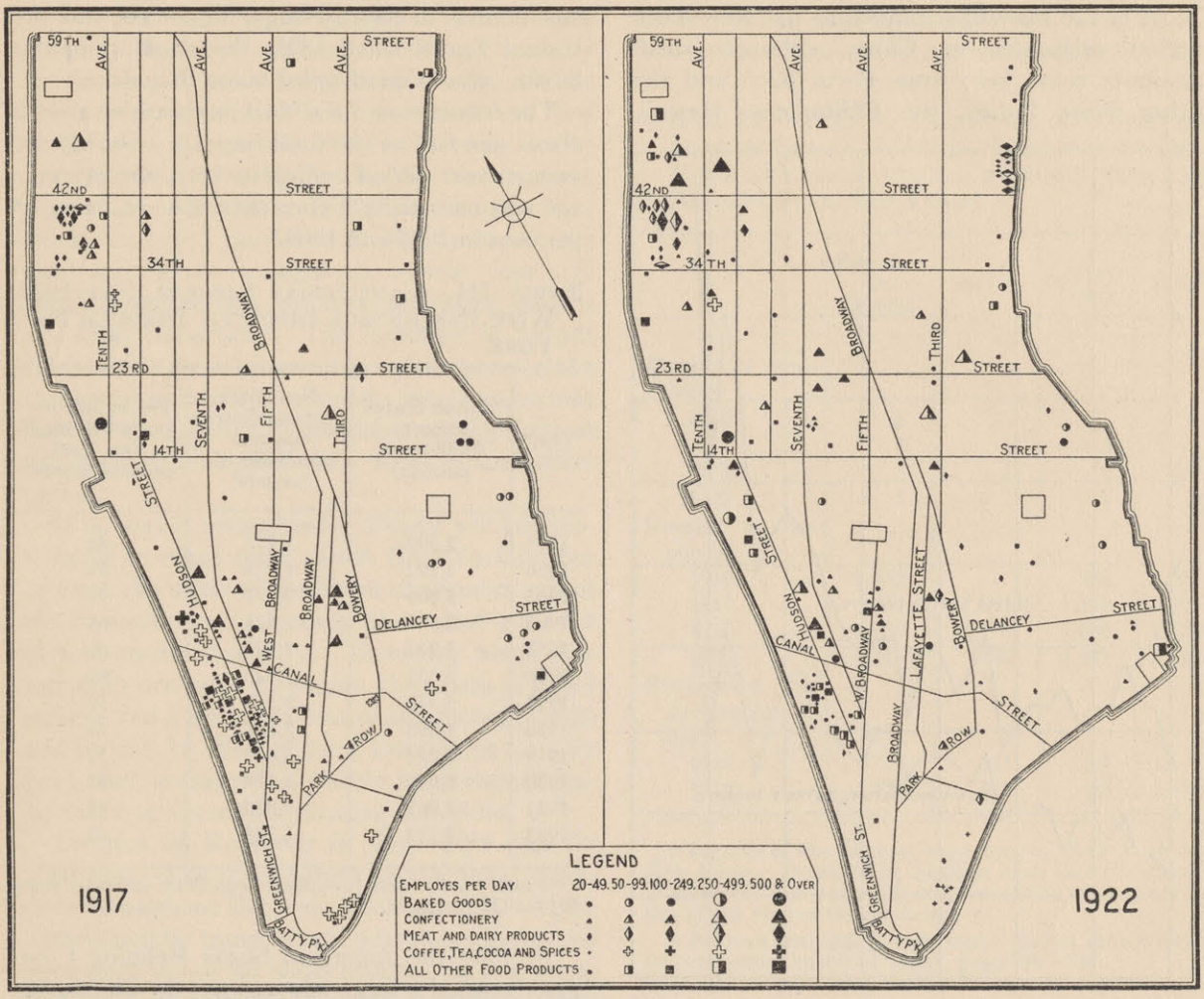

DIAGRAM IV

Location of food plants with 20 or more employes on Manhattan Island South of 59th Street in 1917 and 1922

TABLE II.—SUGAR REFINING IN NEW YORK STATE IN 1899, 1904, 1914, AND 1919

	Number of wage-earners	Value of product (in thousands)
1899	3,275	$90,680
1904	3,707	116,439
1914	4,899	124,941
1919	6,289	268,318

[1] This omission is in accordance with the census custom of not publishing statistics which may reveal the operations of a given factory to its competitors.

large amounts of sugar to European consumers who would normally have been supplied by the beet sugar factories of France, Germany, and Czechoslovakia. In 1918 refineries in New York harbor absorbed 12 per cent of the cane sugar crop of the entire world, and in 1919, 16 per cent. In those years their production amounted to 47 and 48 per cent of the refined sugar output of the United States.

Since census statistics for the amount of sugar

refined in the region about the port of New York are incomplete, the best index to the growth of the industry in the district is furnished by the figures on the amount of raw sugar imported through the customs district of New York. Most of the raw sugar refined in the New York region originates in Cuba, although small amounts come here from Porto Rico and the other West Indies, the Philippines, Hawaii,

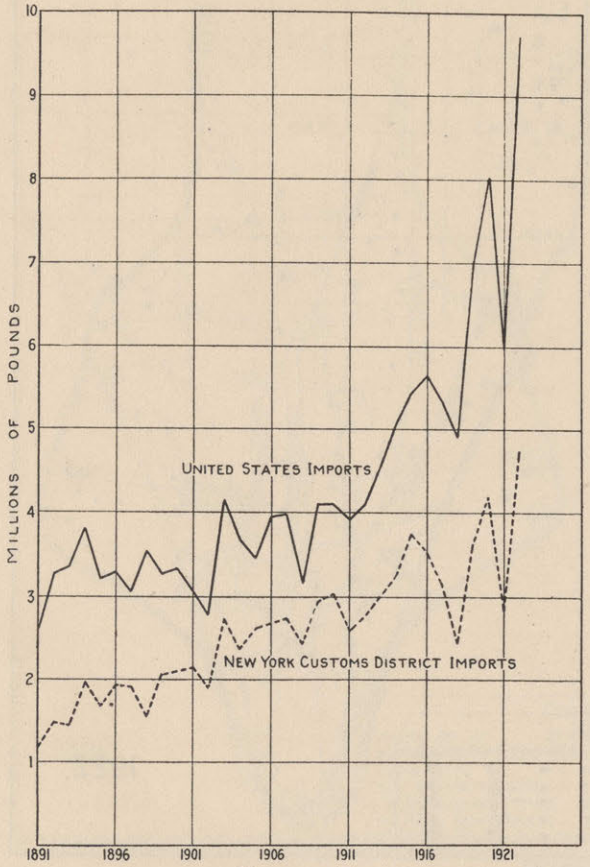

DIAGRAM V

Cane sugar imports, entire country and New York customs district, 1891–1922

South America, and Java. Under the Spanish régime, Cuban sugar production did not exceed one million tons of raw sugar a year. After the Spanish-American War, however, large amounts of American capital were invested in the Cuban industry, and there was an almost continuous increase in Cuban sugar crops from 1900 through 1920. Production declined from the 1920 level in 1921, but reached a very high figure in 1922. Raw sugar is shipped in full cargo lots and normally it is not unloaded until it reaches the refinery, so that statistics of imports through this port give an excellent indication of the amount of refined sugar produced here. Table III and Diagram V show that there was an almost continuous increase in the raw sugar imported into the United States since 1891, the annual imports having nearly quadrupled since that date.

The refineries in New York harbor now absorb about one-half of the total imports. During the twenty-year period ending in 1916, the percentage was materially higher than this, reaching 76 per cent in 1905 and 1908.

TABLE III.—CANE SUGAR IMPORTS, 1891–1922, WITH PERCENTAGE IMPORTED THROUGH NEW YORK

Year[a]	United States imports (millions of pounds)	New York customs district imports (millions of pounds)	Percentage imported through New York customs district
1891	2,592	1,177	45
1896	3,292	1,918	58
1901	3,066	2,172	71
1906	3,931	2,674	68
1911	3,913	2,599	66
1916	5,631	3,528	63
1917	5,330	3,142	59
1918	4,898	2,422	48
1919	7,020	3,617	52
1920	8,029	4,179	52
1921	5,967	2,826	47
1922	9,722	4,735	49

[a] Fiscal years ending June 30 through 1918; calendar years 1919–1922 inclusive.

In 1909 the American Sugar Refining Company opened a large new refinery in Chalmette, Louisiana (just below New Orleans), and diverted there a portion of the raw sugar which had been coming to its northern plants. It is quite possible that the decline was further accentuated by the reorganization of this company which followed the government investigations of 1907–1912.[1]

[1] The American Sugar Refining Company had attempted to concentrate sugar refining for the entire country in its own plants and in those of its affiliated companies. It controlled four plants about New York harbor: one in Jersey City, one in Brooklyn, one in Long Island City, and one in Yonkers. The decline of the control of the American Sugar Refining Company may have operated to enable refineries located in ports other than New York to increase their output.

In 1921 the proportion of the sugar for the entire country which entered by way of New York harbor declined still further, for in that year the American Sugar Refining Company opened another large, new refinery in Baltimore and closed its Jersey City plant. The reasons given by the American Sugar Refining Company for this step are that freight rates to the Middle West are cheaper from Baltimore than from New York; that a more reliable type of labor can be found in Baltimore than in the New York region; that land in Baltimore is cheaper than in New York; and that Baltimore is slightly nearer the chief source of raw sugar than New York. It seems probable that the item of freight rates is the most important. The increases in freight rates which have occurred in recent years make transportation costs a much more important item in the location of manufacturing plants at the present time than they were at an earlier period.

It is, and it undoubtedly always will be, economical to refine sugar about New York harbor to meet the needs of the direct consumers and of the manufacturers of candy and baked goods in this immediate vicinity. However, when new refineries are built to supply the needs of other regions and a saving in cost of shipments to consumers can be effected by a location in another port, that saving will probably be of enough importance to determine location elsewhere.

Location of Refineries in New York and Its Environs.—The distribution of the sugar refineries throughout the New York region is largely determined by transportation factors. Refineries need dock space for ships bringing in raw sugar and coal, and railroad connections (the more the better) for the shipment of the finished product. They also need a plentiful supply of fresh water.[1] In addition, a sugar refinery requires a large area for its equipment. The sugar refiner is more apt to think in terms of acres than of blocks, and a site where the blocks are of unusually large size is greatly to his advantage.

The earliest sugar refineries in New York City and its environs were located on Manhattan Island, but not on the waterfront. In early Dutch days an inland refinery was built on Liberty Street, and it helped to supply New York with sugar for more than one hundred and fifty years. The Rhinelander refinery, another inland establishment, was located near the corner of Rose, Duane and William Streets early in the century and was not torn down until 1893.[1] The Havemeyer plant, built in 1858 in Brooklyn, was the first waterfront refinery in this vicinity, and the advantages of its location were found to be so great that inland refining for imported raw sugar became a thing of the past. In 1900 there were in operation about New York harbor five sugar refineries: three in Brooklyn, one on Newtown Creek in what is now Long Island City, and one in Jersey City.[2] By 1912 two of the Brooklyn

TABLE IV.—PLANTS, EMPLOYES, AND PRODUCTION OF SUGAR REFINING INDUSTRY IN NEW YORK AND ITS ENVIRONS, BY SUBDIVISIONS OF AREA IN SELECTED YEARS

	Brooklyn and Queens	Yonkers	New Jersey	Total
Number of refineries[a]				
1900	4	..	1	5
1912	3	2	2	7
1917	3	2	2	7
1922	3	2	1	6
Number of employes[a]				
1910	2,533	..	892	3,425
1912	3,261	1,394	1,140	5,795
1917	2,950	1,770	1,000	5,720
1922	4,219	2,148	1,321	7,688
Production (in thousands of tons)				
1918	777	411	295	1,483
1919	928	493	428	1,849

[a] Records of the factory inspectors of New York and New Jersey. It should be borne in mind that the number of employes represents the number at the refinery on the day of the visit of the inspector.

[b] Refiners' meltings in long tons. Joshua Bernhardt, in Government Control of Sugar, pages 245–246.

[1] Sugar refining requires a gallon of water and a half pound of coal for every pound of sugar refined.

[1] Freeman, op. cit., page 7.

[2] The refinery in Yonkers owned by the National Sugar Refining Company was not in operation in that year.

refineries had consolidated, so that without loss of plant there were then in Brooklyn only two separate refining companies, and two new plants had been built on the Hudson River, one in Edgewater and one in Yonkers. From 1912 to 1921 there was no change in the location of plants and no new refineries were built, although there was a development of equipment and refining capacity in those already existing. As has been noted, however, early in 1922 the Jersey City refinery was closed.[1]

Table IV summarizes the most important of the available statistics relating to the distribution of the sugar refineries in the various sections of the area.

Slaughtering and Meat Packing Establishments

Under this heading there have been grouped the establishments in the region in and about New York where slaughtering, meat packing, sausage making, and the packing of fish and oysters are carried on. In 1922, according to the factory inspection records, there were 168 such establishments in New York and its environs.

The group of plants devoted to fish and oyster packing is relatively unimportant. In 1922, in Manhattan below 59th Street (Zone I), there were eight of these plants with 115 employes; in the Twenty-mile Industrial Zone there were four more such establishments with 17 employes, and in the Outlying Area[2] nine plants with 323 employes.[3] The plants which confine their activities to making sausages are also of minor importance. They number five, employ 105 men, and are all of them located in Manhattan below 59th Street.

Importance of Slaughtering and Meat Packing in the New York Region.—In the field of slaughtering and meat packing proper, however, a quite different situation obtains. In New York and its environs there are 66 large and 64 small establishments of this type.[4] The large plants employed 6,200 men in 1922, and the small ones 408 men. These abattoirs make the region one of the most important slaughtering centers in the country. In 1921 it ranked next after Chicago and Kansas City in the number of cattle and calves slaughtered during the year.

The value of the meat packed in the larger cities of this region was $276,755,000 in 1919,[1] making slaughtering and meat packing second in rank among the food industries of the region. The area accounts for more than 6 per cent of the total value of meat produced in slaughter-houses in the entire United States, while the population of the region represents approximately 9 per cent of the population of the whole country. When one considers the distance between New York and the sections of the country where most of the cattle are raised, and the economies made possible by shipping dressed meat rather than livestock, the amount of slaughtering done here is surprisingly great.

As a matter of fact, New York City slaughters a larger proportion of the meat which it consumes than most of the cities in the eastern portion of the United States. Since the dressed meat industry first came into prominence in 1886, more and more of the slaughtering of meat animals, and of beef animals in particular, for the entire country has been done in the Middle West. There is, however, a consumers' preference in favor of freshly killed meat, and particularly in favor of fresh pork. Experts in cold storage say that this preference is based on prejudice; that pork which has been properly chilled will keep in a satisfactory condition as long as beef. The meat turns slightly gray, however, and loses its look of freshness, and many housewives hesitate to buy it for fear it may contain disease germs. This preference naturally affects the policy of retail dealers in meat, and they will pay more for pork dressed within the region than for western meat. In the case of beef, veal, and lamb, the preference of the Jewish population for meat killed and dressed in accordance with the Jewish ceremonial requirements has encouraged local slaughtering. For the Kosher trade only the forequarters of the animal are used, even after it has been ceremonially killed and, in addition, meat more than seventy-two hours old is not eaten by orthodox Jews unless it is absolutely neces-

[1] This was at the time of the opening of the American Sugar Refining Company's new plant at Baltimore.

[2] Diagram I, page 12, for limits of these zones.

[3] Most of those in the last group are on the coast of Long Island and in Connecticut.

[4] Large plants are defined as those with 20 or more employes.

[1] Reports of the Bureau of the Census.

sary, and then only after it has been ceremonially cleansed.

Since slaughtering in New York City is greatly influenced by this Jewish ceremonial requirement, the strength and probable persistence of this factor become important elements in the problem. Jewish immigration to the United States was relatively small before 1885, but since that time, although it has varied from one year to another and was especially small during the years of the war, it has been very important. The following table gives the growth of the Jewish population in the three states involved in the region under consideration in this study.

TABLE V.—JEWISH POPULATION IN NEW YORK, NEW JERSEY, AND CONNECTICUT IN SELECTED YEARS[a]

Year	New York	New Jersey	Connecticut	Total
1877	80,565	5,593	1,492	87,650
1900	400,000	25,000	8,000	433,000
1905	820,000	40,000	8,500	868,500
1918	1,603,923	149,746	66,862	1,820,531

[a] Figures from the American Jewish Yearbook.

Since the Jewish population of the important cities included within the area of New York City and its environs constituted 95 per cent of the Jewish population in New York, New Jersey, and Connecticut in 1918, it seems safe to conclude that the above figures give an accurate impression of this situation in the region included in this survey.

How long the rabbinical requirements will continue to exert a large influence upon the consumption of meat within the district cannot be foretold with any certainty. An important branch of the Jewish congregation has ceased to emphasize the necessity of observing Kosher requirements, and an increasing number of the American Jews are breaking away from the old tradition. Indeed, it is estimated that the consumption of Kosher meat in the New York region has decreased about 25 or 30 per cent in the last ten years. This was due, in part, to a change in the habits of the Jews already resident here, and, in part, to the decline of Jewish immigration after 1914. It is expected that immigration within the next few years will again increase the number of orthodox Jews in the district and consequently the demand for Kosher food, but how long this will last is again problematical. In general, however, men conversant with the situation feel that as time goes on Kosher requirements will be of less and less importance.

The following prices for city-killed and western-killed meat in the New York market on a typical day in July, 1923, will serve to illustrate the preference for city-killed meat:

TABLE VI.—WHOLESALE MEAT PRICES IN NEW YORK ON JULY 10, 1923[a]

(Dollars for 100 pounds)

	Western-killed	City-killed
Dressed lamb, carcass	$32.00	$32.00–34.00
Dressed veal, carcass	20.00	23.00
Beef, forequarters	13.00	15.00
Beef, hindquarters	25.00–26.00	26.00–27.00
Veal, forequarters	14.00	18.00

[a] Figures from the New York office of the Bureau of Agricultural Economics.

The result of the various preferences above combined in 1922 to bring meat to the New York market as follows:

TABLE VII.—RECEIPTS OF MEAT IN THE NEW YORK DISTRICT IN 1922, BY VARIETY OF MEAT AND POINT WHERE DRESSED[a]

(Thousands of pounds)

	Western dressed	City dressed	Country dressed	Total
Beef	253,200	315,000	3,000	571,200
Veal	64,560	83,880	13,040	162,480
Lamb and mutton	68,700	103,250	750	172,700
Pork	4,290	264,880	770	269,940
Pork cuts and offal	52,481	..	..	52,481
Beef cuts and offal	7,569	..	..	7,569
Total	450,800	767,010	18,560	1,236,370
Percentages	36.5	62.0	1.5	100.0

[a] Figures from the New York office of the Bureau of Agricultural Economics.

Development of the Industry.—Figures on the total output of the abattoirs in the region in

terms either of animals slaughtered or in pounds of meat produced are available for only part of the period covered by this study. At the present time all the slaughter-houses in the vicinity are under federal supervision, but until very recently responsibility for meat inspection was divided between several different agencies with the result that statistics are incomplete and unsatisfactory. The impression among the men prominent in the industry is that slaughtering in and about New York City increased very rapidly from 1900 to 1914, particularly between 1905 to 1910; that it declined until 1917; and that it has increased at a slower rate since that time. The decline from 1914 through 1917 is attributed to the decline in Jewish immigration in those years, to the breaking away from Kosher observance by a part of the Jewish population, and, in 1917, to wartime restriction of meat consumption. In 1918 part of the slaughtering for the Army was transferred to the New York abattoirs as slaughtering facilities in Chicago became overtaxed, and in the succeeding years the upward trend seems to have been gradual but steady.

These general impressions seem to be borne out by such figures as are available.

TABLE VIII.—SLAUGHTER-HOUSES AND MEAT AND FISH PACKING ESTABLISHMENTS WITH 20 OR MORE EMPLOYES IN NEW YORK AND ITS ENVIRONS IN 1900, 1912, 1917, AND 1922

1900	21
1912	44
1917	44
1922	70

Table VIII, based on records of the factory inspectors, shows the general development of the industry but does not show its remarkable growth from 1905 to 1910. This is indicated, however, by census figures for the four most important slaughtering centers in the district given in Table IX. The decline in the number of plants from 1914 to 1919 shown in this table does not give an accurate index of the decline in the industry within the district since it was accompanied by a substantial increase in the number of employes. Figures from the factory inspection records in Table X illustrate the growth in size of plants which makes possible a reduction in their number.

It will be seen from these figures that there has been a decided growth in the number of small and medium sized slaughter-houses in the last twenty years. It is the opinion of some persons in the industry that the overhead expenses of the very large establishments, particularly those of administration and record-keeping, have become so great that they offset the economies possible in the disposal of by-products in such plants, and that the medium sized rather than the very large plant will become typical of the industry in the future.

It is difficult to estimate recent growth in output per plant from figures such as those presented in the tables given above, because of a change which has taken place in the industry between 1914 and 1919. The basic eight-hour day was introduced by the large packers in 1918, and men

TABLE IX.—ESTABLISHMENTS AND WAGE-EARNERS[a] ENGAGED IN WHOLESALE SLAUGHTERING AND MEAT PACKING IN FOUR IMPORTANT SECTIONS OF NEW YORK AND ITS ENVIRONS IN 1899, 1904, 1909, 1914, AND 1919

Section	Establishments					Wage-earners				
	1899	1904	1909	1914	1919	1899	1904	1909	1914	1919
Manhattan and the Bronx	42	34	112	83	52	1,705	1,690	3,924	3,433	3,672[b]
Brooklyn	8	11		40	21	185	307		694	753
Jersey City	12	9	20	16	12	149	148	856	1,179	1,992
Newark	8	10	13	15	7	169	202	288	301	530
Total	70	64	145	154	92	2,208	2,347	5,068	5,607	6,947

[a] The figures represent the average number of wage-earners in the year.
[b] Not including the Bronx.

TABLE X.—SLAUGHTERING AND MEAT AND FISH PACKING ESTABLISHMENTS IN NEW YORK CITY, CLASSIFIED BY NUMBER OF EMPLOYES IN 1900, 1912, 1917, AND 1922[a]

Number of employes per plant	Number of plants				Percentage of plants				Percentage of employes			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
1–19	22	92	78	71	56	72	71	58	13	20	25	10
20–49	9	16	21	31	23	12	19	25	19	15	28	23
50–99	7	13	6	10	18	10	5	8	36	21	16	15
100–249	..	5	5	8	..	4	5	7	..	19	31	28
250–499	1	1	..	1	3	1	..	1	34	11	..	10
500–999	..	1	..	1	..	1	..	1	..	14	..	14
Total	39	128	110	122	100	100	100	100	100	100	100	100

[a] Figures for the smaller slaughter-houses in New Jersey and Connecticut seem to be incomplete for the earlier years and are therefore omitted from this table.

prominent in the industry say that this has necessitated employing more workers to do the same amount of work. As more than 43 per cent of the men employed in slaughter-houses in New York State worked sixty hours a week in 1914, this contention seems reasonable.

Raw Materials and Transportation to Plant.—The food animals slaughtered in New York City and its environs come into the region by rail, some from the dairying sections of neighboring states, but most of them from the Middle West. They are received from the railway cars in stockyards which are widely scattered. The three largest are those of the Jersey City Stock Yard Company at Jersey City, the Central Union Stock Yards at Communipaw, New Jersey, and the 60th Street Stock Yard on the west side of Manhattan. There is a smaller yard at 40th Street and the Hudson River for receiving hogs only. After the animals have been discharged from the railway cars, have been fed and watered and allowed to rest, they are conveyed by lighter to the slaughter-houses for which they are destined. The Manhattan slaughter-houses receive their animals directly from the lighters, but in Brooklyn it is necessary to drive them for long distances through the city streets. A municipal regulation allows this procedure between the hours of twelve midnight and six in the morning. In Jersey City small packers of sheep, lambs, hogs, cattle, and calves slaughter within the boundaries of the stockyard itself.

Location of Slaughter-houses and Meat Packing Establishments.—The location of slaughter-houses in Manhattan and Brooklyn is restricted by the Sanitary Code adopted in 1898. The provisions which apply to slaughter-houses read as follows:

> Sec. 83. The business of slaughtering cattle, sheep, swine, pigs or calves, shall not be conducted in the City of New York without a permit from the Board of Health. Nor shall such business be conducted unless the same shall be in buildings located on or near the water front, and all buildings shall be constructed so as to receive all stock delivered thereat from boats, cars, or transports and to secure the proper care and disposition of all parts of the slaughtered animals upon the premises or the immediate removal thereof by means of boats. It shall not be unlawful, however, to slaughter cattle, sheep, swine, pigs, or calves in the Borough of Brooklyn at such places where such business was established and carried on on January 3, 1898.
>
> Sec. 84. The business of slaughtering cattle, sheep, swine, pigs or calves in the Borough of Manhattan shall be conducted on the west side of the borough between north of the middle line of the block between West 38th and West 39th Streets and the south side of West 41st Street, Eleventh Avenue and North River, inclusive; and the slaughtering of cattle, sheep, or calves on the east side of the borough shall be between the north of the middle line of the block between East 42nd Street and East 43rd Street and the south side of East 47th Street, First Avenue and East River.

Table XI, which presents the census data regarding the value of the products of the industry,

gives interesting evidence of its trend. Between 1914 and 1919 there was an increase of 70 per cent in Manhattan, 92 per cent in Brooklyn, 210 per cent in Jersey City, 175 per cent in Newark, and 99 per cent in the entire region.

TABLE XI.—VALUE OF PRODUCTS PRODUCED BY WHOLESALE SLAUGHTERING AND MEAT PACKING ESTABLISHMENTS

(In thousands of dollars)

Section	1900	1905	1909	1914	1919
Manhattan and the Bronx	38,753	46,477	95,862	91,567	153,808[a]
Brooklyn	3,101	7,500		16,356	29,454
Jersey City	5,709	7,569	22,314	25,235	78,236
Newark	3,093	2,934	4,297	4,832	13,274
Total	50,656	64,480	122,463	137,990	274,772

[a] Not including four establishments in the Bronx for which no figures are given. The Bronx is included in this table not because of its importance, but because it is impossible to separate figures for Manhattan for the early years.

When it is recalled that wholesale prices in general increased 106 per cent during the period from 1914 to 1919, and that wholesale meat prices increased almost 100 per cent, it will be seen that these figures imply that slaughtering throughout the entire district remained practically stationary in this period and that there was a marked decrease in Manhattan.

A small part of the decrease is to be explained by the fact that in 1917 the large packers encountered a conflict of religions which seemed to admit of no solution. Jewish consumers will not eat meat from animals slaughtered on Saturday, nor will they buy meat on Monday that was prepared on Friday. Therefore when the slaughter-house employes, most of them Gentiles, refused in 1917 to continue an old practice of working on Sunday, the large houses discontinued Sunday slaughtering, with the result that meat consumption on Monday declined greatly among orthodox Jews.

The slaughter-house districts on Manhattan are thus divided by the entire width of the island. The west side section is separated from the theater and shopping centers by a factory district about three blocks wide. The section on the east side borders on a residence district and is separated from one of the most expensive sections in the city by three blocks of poor dwellings.

In Brooklyn there are also two slaughter-house sections, one in Johnson Avenue and one in Hudson Avenue. Neither section is near the waterfront, and slaughtering continues to be carried on there only because of long established custom. Table XII, together with the maps shown facing page 15 and those on pages 16 and 17, throws light on the distribution of plants employing more than 20 workers.

TABLE XII.—SLAUGHTER-HOUSES AND MEAT AND FISH PACKING ESTABLISHMENTS WITH 20 OR MORE EMPLOYES

	Number of establishments				Percentage of employes			
	1900	1912	1917	1922	1900	1912	1917	1922
Zone I	14	29	24	36	61	59	37	47
Zone II	6	11	16	27	38	30	59	47
New York	3	7	8	15	7	11	19	14
New Jersey	3	4	8	12	31	19	40	33
Zone III	1	4	4	7	1	11	4	6
Total	21	44	44	70	100	100	100	100

This table shows clearly that the restriction of the slaughter-house districts in Manhattan and Brooklyn has not prevented expansion in these two boroughs. The advantages of a location near the population center are so great as to provide a powerful incentive to the packers established there to improve and expand their facilities within the restricted areas. New slaughter-houses were erected to replace outworn plants on the east side in 1913 and 1922, and on the west side in 1918. At the present time slaughter-houses on both sides of Manhattan are installing new machinery for the disposal of blood. A city ordinance prevents emptying blood into the sewers, and the machinery now in use has not proved entirely successful in eliminating the odors attendant upon the operation of converting blood to fertilizer. The new apparatus will dispose of the blood by a different process and

produce "crackling," a product used in making chicken feed.

The product of the slaughter-houses of the New York district was divided as follows in 1922:

TABLE XIII.—PRODUCT OF SLAUGHTER-HOUSES IN THE NEW YORK DISTRICT IN 1922, BY VARIETY OF ANIMALS SLAUGHTERED[a]

(In thousands of pounds)

	Manhattan	Brooklyn	Jersey City	Newark	Total
Steers	161,108	31,678	33,636	13,436	239,858
Cows	32,103	6,274	3,087	..	41,464
Bulls	21,677	4,352	3,766	2,851	32,646
Calves	55,295	10,571	14,234	3,226	83,326
Sheep	67,102	15,155	16,489	3,950	102,696
Horses	..	541	..	..	541
Hogs	121,775	..	72,784	66,776	261,335
Goats	..	1[b]	..	..	1
Total	459,060	68,572	143,996	90,239	761,867
Percentages	60.2	9.0	18.9	11.9	100.0

[a] Figures from the New York office of the Bureau of Agricultural Economics.

[b] 750 pounds.

Bakeries

Baking in New York is more than a local service. Due principally to the presence of large biscuit and cake bakeries, whose product under modern methods can be shipped long distances without spoilage, the region does much more than supply itself with baked goods. As will be seen from the figures in Table XIV, in 1919 New York City alone produced more than 15 per cent of the bread and bakery products made in the United States, although its population at that time represented but 9 per cent of the population of the entire country. The decline in the percentage of baked goods produced in New York City in recent years is probably to be explained by the extension of cracker bakeries in other cities.

TABLE XIV.—VALUE OF PRODUCT OF BREAD AND OTHER BAKING ESTABLISHMENTS IN NEW YORK CITY AND IN THE UNITED STATES, 1899–1919, WITH PERCENTAGES[a]

(In millions of dollars)

Year	United States	New York City	Percentage New York City to United States
1899	176	32	18.4
1904	270	44	16.3
1909	397	62	15.6
1914	492	80	16.3
1919	1,152	174	15.1

[a] Data from federal census.

Branches of the Industry.—As modern methods have been developed, three distinct types of factory bakeries have been evolved. There is, first, the plant which specializes in bread baking, which confines its operations to one or two kinds of bread and which turns out from three to five thousand loaves a day for distribution within the region. Second, there is the large-scale cake bakery, producing loaf cake of various kinds which, cut into convenient sizes, wrapped in paraffin paper, and put into pasteboard cartons, is sometimes distributed considerable distances from the factory. Finally, there is the plant which confines itself to the production of fancy cookies, biscuits, and crackers often for a wide market. The first type is the most numerous. Its product is a part of the daily food of almost every member of the population. The third type produces for the largest territory. The factory of the second type, the cake bakery, has often been combined with that of the first type largely because such a combination makes possible an economical use of delivery trucks. The large bakers deliver more than two-thirds of their product directly to the retailer, and the expense of these deliveries constitutes an important part of the cost of production in the baking industry.

Statistics are not available to show the relative importance of bread and cake baking, but Table XV, compiled from census data, does separate the facts regarding the production of biscuits and crackers so that they may be compared with other bakery products for New York State and for the country as a whole.

It will be seen that the number of establishments devoted to the production of crackers and biscuits is much smaller than the number engaged in the production of other sorts of baked goods, but that the average size of the biscuit factories is much larger than the average size of other baking establishments. The contrast

TABLE XV.—BISCUITS AND CRACKERS COMPARED WITH OTHER BAKERY PRODUCTS FOR NEW YORK STATE AND UNITED STATES IN 1919

	New York State	United States	Percentage New York State to United States
Biscuits and crackers			
Number of establishments	29	176	16.5
Number of wage-earners	9,531	34,341	27.8
Average number wage-earners per establishment	329	195	..
Value of product	$60,729,236	$204,020,000	29.7
Value added by manufacture[a]	$32,346,017	$100,886,000	32.1
Average value added by manufacture per employe	$3,394	$2,938	..
Other bakery products			
Number of establishments	3,868	24,919	15.5
Number of wage-earners	19,010	107,251	17.7
Average number wage-earners per establishment	4.9	4.3	..
Value of product	$172,477,650	$947,876,000	18.2
Value added by manufacture[a]	$63,690,386	$337,771,000	18.8
Average value added by manufacture per employe	$3,350	$3,149	..

[a] Value of product less cost of materials.

between the value added by manufacture in the biscuit and cracker factories and in the other baking plants in New York State and in the United States is very interesting. The average value added by manufacture per employe in the biscuit industry in 1919 was $3,394 in New York State and $2,938 in the entire United States; and the average value added per employe in the production of other bakery products was $3,350 in New York State and $3,149 in the entire United States. It would seem that the average baking establishment in New York State is better equipped than the average baking establishment in the United States.

Size of Establishments.—The baking of bread, cake, cookies, and pastry has been one of the last of the important household industries to become a part of the factory system. The neighborhood bakeshop was, it is true, a well-recognized institution in every community long before the industrial revolution, but its methods and its tools were essentially those of the households which it served and they have until the past twenty-five years remained so. Dr. George M. Price, who in 1912 made an intensive investigation of the bakeries of New York State for the Factory Investigating Commission, wrote at that time:

> Of all the industries indispensable to human economy, not one is so important or so closely related to the health of the nation as that of baking "our daily bread." In spite of all this, there is no industry which has achieved so little progress or which is conducted under such unsanitary conditions, with processes so elementary and archaic, as the trade of bread baking . . . . .
>
> There were 3,002 bakers in the 480 bakeries which were examined and, deducting the 562 workers of the six factory bakeries, there remain 2,440 workers in 474 bakeries, or about five to each shop. There has been, however, during the last ten years a noticeable tendency to centralize this industry, to put it in the hands of large capitalists and to introduce a large number of machines.[1]

Since Dr. Price wrote the paragraphs just quoted, the tendency toward larger bakeries has continued. Table XVI, compiled from census figures, illustrates the development of the larger bakeries in New York State, New Jersey, and Connecticut, and at the same time brings out the fact that a great part of the industry is still carried on in very small establishments.

According to this tabulation, the average number of workers per bakeshop increased from five in 1909 to 6.6 in 1919. In New York City the average is somewhat higher. It has risen from 5.6 in 1899 to 6.5 in 1904 and 1909, to eight in 1914, and to 9.4 in 1919. This increase has come about partly because of a decline in the number of

[1] Price, George M.: "Report on Bakeries and Bakers in New York City." In Preliminary Report of the Factory Investigating Commission, Vol. I, pages 203, 208.

TABLE XVI.—PLANTS AND WAGE-EARNERS IN BAKERY INDUSTRY IN NEW YORK, NEW JERSEY, AND CONNECTICUT IN 1909 AND 1919,[a] DISTRIBUTED ACCORDING TO SIZE OF ESTABLISHMENTS

Number of wage-earners per establishment	Number of establishments	1909 Number of wage-earners	Percentage of wage-earners	Number of establishments	1919 Number of wage-earners	Percentage of wage-earners
None	426	..	..	679	..	..
1–5	4,224	10,592	37.6	4,035	9,313	25.5
6–20	839	7,490	26.6	765	6,979	19.1
21–50	87	2,749	9.8	96	3,061	8.4
51–100	31	2,233	7.9	43	3,113	8.5
101–250	13	1,928	6.8	23	3,334	9.2
251–500	5	1,541	5.5	9	3,505	9.6
501–1,000	..	..	..	1	529	1.5
Over 1,000	1	1,629	5.8	3	6,639	18.2
Total	5,626	28,162	100.0	5,654	36,473	100.0

[a] Census of Manufactures for the United States, 1909 and 1919. Federal statistics for the three states included in the region are used in this table because of the fact that the state departments of labor did not compile complete bakery statistics in the early years. The number of wage-earners is the average number employed during the year.

bakeries with less than 20 workers, but more because of an increase in the number of bakeries with more than 100 workers. In 1909 there were only 19 bakeries in New York, New Jersey, and Connecticut with more than 100 wage-earners; in 1919 there were 36, an increase of almost 100 per cent.

The factory inspection data presented in Table XVII indicates that the increase in large bakeries in New York City proper has been very rapid indeed. Plants employing more than 100 workers jumped from six in 1900 to 18 in 1922. Whereas such plants employed but 16.8 per cent of the bakery workers in 1900, they were employing 58.3 per cent in 1922.

The development of large bakeries with modern equipment and sanitary methods was undoubtedly hastened in New York by the work of the Factory Investigating Commission of 1912. The published reports of the Commission enlightened the public as to the conditions under which an important article of food was being prepared, and tended to bring patronage to the larger and better equipped bakeries which could advertise the fact that sunlight and cleanliness prevailed in their establishments and that

TABLE XVII.—GROWTH OF BAKERIES IN NEW YORK CITY,[a] 1900, 1912, 1917, AND 1922

Number of employes per establishment	Number of establishments				Per cent of establishments				Per cent of employes			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
1–19	2,552	1,466	1,478	1,477	98.8	96.6	96.2	95.4	76.7	41.2	41.0	26.3
20–49	20	26	35	35	.8	1.7	2.3	2.3	4.2	6.8	6.7	7.6
50–99	5	19	12	19	.2	1.2	.8	1.2	2.3	10.3	4.9	7.8
100–249	..	5	9	13	..	.3	.6	.8	..	6.4	8.8	11.0
250–499	5	1	..	2	.2	.1	..	.1	7.6	2.5	..	4.4
500–999	..	..	1	1	..	..	..	.1	..	..	4.5	3.5
1,000 and over	1	1	2	2	..	.1	.1	.1	9.2	32.8	34.1	39.4
Total	2,583	1,518	1,537	1,549	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Statistics for New York City only are used in this table, since the figures for the New Jersey and Connecticut sections of the region under consideration seem to be incomplete for 1900 and 1910.

precautions were taken to protect the product during distribution.

As has already been pointed out, the factory inspection data relating to small bakeries in the New Jersey and Connecticut sections of the region are not complete for the years before the war. However, with the co-operation of the labor departments of the three states, the records for 1922 have been made reasonably complete. Table XVIII shows the distribution and size of baking plants throughout the region in that year.

TABLE XVIII.—DISTRIBUTION AMONG ZONES OF BAKERY ESTABLISHMENTS AND EMPLOYES IN 1922 AND OF POPULATION IN 1920

Number of employes per establishment	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III Outlying Region	Total
Number of establishments				
1–19	324	2,552	622	3,498
20–49	15	33	3	51
50–99	6	15	2	23
100–249	1	12	..	13
250–499	1	2	..	3
500–999	..	1	..	1
1,000 and over	1	1	..	2
Total	348	2,616	627	3,591
Per cent of total	9.7	72.8	17.5	100.0
Number of employes				
1–19	1,133	8,087	1,675	10,895
20–49	553	1,165	104	1,822
50–99	472	1,004	115	1,591
100–249	150	1,741	..	1,891
250–499	405	691	..	1,096
500–999	..	605	..	605
1,000 and over	4,705	2,107	..	6,812
Total	7,418	15,400	1,894	24,712
Per cent of total	30.0	62.3	7.7	100.0
Population	1,063,962	6,746,181	1,168,912	8,979,055
Per cent of total	11.9	75.1	13.0	100.0

Location of Bakeries.—The large bakeries of the entire region are located in Zones I and II. In fact a large part of the bakery-made bread, cake, and crackers consumed by the population of Zone III is manufactured in the bakeries of Manhattan, Brooklyn, and the Bronx.

It will be seen from these figures that while Zone I houses about 12 per cent of the population of the entire region, almost 30 per cent of the bakery workers of the region are employed there. About 75 per cent of the population of the region live in Zone II and about 62 per cent of the bakery workers are employed there; while in Zone III, where about 13 per cent of the people living in the region make their homes, only 8 per cent of the bakery workers are employed. This difference in distribution is caused partly by the fact that many people who live in Zone II and Zone III take many meals in Zone I; partly by the fact that bread baking is less rare among suburban than among city housewives, and partly by the fact that much of the baked goods produced in Zones I and II is consumed in Zone III.

Before the development of the factory type of bakery the individual units of the industry invariably catered to the immediate neighborhood in which they were located. The fact that the baker of the early period had little capital and hired few employes led him to use for his bakeshop the cheapest space available in the residence districts, usually the cellars of tenements and apartment houses. There he could build a brick oven without great expense, store his flour, and bake his product. If his combined workroom and storeroom never saw any sunlight, and was badly ventilated and hard to keep clean, his workers were too weak to make their complaints effective, and his patrons either did not know or did not seem to care.

It is true that there were investigations of bakeshop cleanliness from time to time,[1] but nothing important was done about the matter until 1913. In the year previous the Factory Investigating Commission conducted a thorough examination of bakeshops in New York City. It was estimated at that time that there were 2,389 cellar bakeries in New York City.[2] Under

[1] In New Jersey in 1893, in New York State in 1894 and in 1896.

[2] This estimate was based on United States census figures for 1909 by deducting from the total number of bakeries in the city 100 factory bakeries located above the ground.

the direction of Dr. George M. Price a staff of six physicians conducted for the Investigating Commission an examination of 800 bakers working in cellar bakeries in New York City. Fifty-seven per cent of those examined (453) showed evidence of disease. Thirty-two per cent showed evidences of general diseases (tuberculosis, rheumatism, anemia, or venereal disease), 12 per cent diseases of the eye, 26 per cent diseases of the respiratory system (bronchitis, pleurisy, asthma, and rhinitis), while 7 per cent had some skin disease. Among the 453 diseased persons in the group there were located 842 different diseases.

The situation revealed by the investigation as regards the unsanitary condition of the cellar bakeries visited, as well as regards the health of workers, combined with evidence gathered in other similar investigations, led the New York legislature to pass, early in 1913, a law requiring the licensing of bakeries and bakers, an annual physical examination of bakers, the enforcement of certain standards of cleanliness, and the observance of much higher standards of light and ventilation in cellar bakeries.[1]

It should be observed, however, that the new standards for cellar bakeries were not applied to existing establishments.[1] This exemption has, of course, greatly reduced the effectiveness of the law. In September, 1923, there were still in Greater New York 3,077 cellar bakeries which had been granted exemption from its provisions.[2]

[1] The relevant sections relating to cellar bakeries of the 1913 law read as follows (Labor Law, Art. 12):

Sec. 331. *Building Requirements.* 1. A bakery shall have proper and sufficient drains, sinks, clean running water, and properly ventilated waterclosets. The waterclosets shall be apart from and shall not open directly into the bakeroom or rooms where the raw material or manufactured product thereof is stored or sold.

2. A bakery shall have adequate windows and, if required by the rules of the board, hoods and pipes or other means for ventilating ovens and ashpits.

3. A bakery shall be at least eight feet in height measuring from the surface of the finished floor to the underside of the ceiling, except that any cellar or basement of less height which was used for a bakery on the second day of May, 1895, need not conform to this provision.

4. The flooring shall be of smooth even cement, or tiles laid in cement, or wood, and shall be free from crevices and holes. The side walls and ceilings shall be either plastered, ceiled, or wainscoted.

* * * * * * * * * * *

Sec. 338. *Cellar Bakeries.* 1. No bakery shall be located in a cellar which does not conform to all the provisions of this section, unless a certificate of exemption has been issued to the owner (a) upon satisfactory proof furnished the Commissioner on or before November 9, 1913, showing that it was operated as a bakery on May 9, 1912, or (b) upon satisfactory proof furnished the Commissioner on or before the 28th of February, 1914, that it was in course of construction on the 9th of May, 1913, or that construction was commenced after the first day of January, 1913, and completed on or before the 9th day of May, 1913, and operated prior to the first day of January, 1914.

2. The bakery shall be at least ten feet high, measured from the surface of the finished floor to the underside of the ceiling. If the bakery is located entirely in the front part of the building, its ceiling shall be not less than four feet, six inches, above the curb level of the street in front of the building; if located entirely in the rear part of the building, or extending from front to rear, the ceiling shall be not less than one foot above the curb level of the street, in front of the building, and the bakery shall open upon a yard or courts extending at least six inches below the floor level of the bakery.

3. The bakery shall be constructed according to plans and specifications approved by the Commissioner and shall be adequately lighted and ventilated.

4. This section shall not prevent the health departments in cities of the first class from exercising any power of regulation now or hereafter vested in them.

Sec. 339. *Enforcement of Article.* 1. The Commissioner shall, except in cities of the first class, enforce the provisions of this article.

2. In cities of the first class, the health departments thereof shall enforce the provisions of this article and for that purpose shall possess all powers conferred by this chapter upon the Commissioner or the Industrial Board.

3. The rules of the board relative to carrying into effect the provisions of this article shall not apply in cities of the first class.

The Laws of 1916 (chapter 503) amended No. 1341 of the New York City Charter and transferred to and conferred upon the Tenement House Department all rights, powers, and duties of the Health Department "with respect to the construction of any structural changes in bakeries and confectioneries in tenement houses."

[1] See Sec. 338 (1).

[2] It will be observed that this figure (3,077) is larger than the figure shown in the 1919 census for all the bakeries located in New York City (2,319), even though it does not include any of the new cellar bakeries built under the provisions of the 1913 law, or any bakeries located above the surface of the ground. This discrepancy is partly to be explained by the fact that the 1919 census records only those establishments which produced goods valued at $500 or more during the year. Another reason may be the fact that many of these cellar bakeries are one-man shops, operating without evidence above ground of their existence, which come to light either in the course of the tenement house inspections of the Health Department or through the applications of the bakers themselves for licenses. Paragraph 2 of Section 337 of the 1913 law reads: "2. The person establishing or operating a bakery shall apply to the commissioner for a certificate within ten days after the bakery commences business. The application shall be made on a blank furnished by the commissioner. No bakery shall operate for more than thirty days after commencing business without a certificate." In Manhattan alone the Health Department had a record of 1,368 cellar bakeries in operation in September, 1923. It seems likely that almost half of these were "proprietor shops," run by the proprietor and his family with no wage-earning employes. If this is true, it would explain the difference between the Health Department records and those of the State Department of Labor, which records almost 750 cellar bakeries with about 2,500 employes on Manhattan Island in 1922. The Department of Labor does not include in its factory inspection establishments which have no wage-earning employes.

It is undoubtedly true that the annual inspections of the Health Department and its reinspections when violations of sanitary regulations have occurred have done much to improve the condition of cellar bakeries in Greater New York, but in recognizing the fact that there are still 3,077 such bakeries in the five boroughs, it is thought-provoking to recall some paragraphs from the 1912 report of the Factory Investigating Commission. They read as follows:[1]

> A cellar is an unfit place for the manufacture of food stuffs, or for the habitation of workers. There cannot be any natural light in a cellar under the most favorable conditions, and no place can be sanitary that lacks sunlight. Cellars are the most difficult places to ventilate unless mechanical ventilation is installed, which is out of the question in the ordinary small bakery. Cellars in which bakeries are located cannot have a temperature which is healthy for workers; they are too near the ground and the emanation from the ground, and the ovens and the heated atmosphere needed for dough raising make it almost impossible for cellar bakeries to have a moderate and equable temperature in the absence of proper ventilation. Cellars cannot be kept clean as other parts of the house, for they are semi-dark, contain most of the plumbing pipes and fixtures, and are, as a rule, the dumping ground of the whole house. Cellars are also the natural habitation of insects, rodents, etc., and are also in proximity to breeding places of flies, which are attracted to the food stuffs.
>
> The abolition of cellar bakeries is, therefore, the first remedial legislation which suggests itself in any scheme of bakery reform.
>
> Of course, there are rare exceptions, as already noted, where a cellar may not be absolutely unsanitary, but they are so rare as to be negligible.

The location of the larger bread and cake factories seems to have been determined in very small part by the source of their raw materials or nearness to railway sidings or dock facilities. Only two of the large bread bakeries in the region have railway sidings running into their buildings, although several others are located near docks on the East River or the North River. All bakeries in the region receive their sugar and their lard by trucks from sugar refineries and lard-rendering plants also within the region. Their flour is in most cases received from flour mills in the West, and it is conveyed to them from the railroad either by lighter (or car float) and truck, or by truck only, as the case may be. Compared with the finished product these raw materials are compact and easy to handle, and in locating their plants bakers have been much more concerned about the distribution of their product than about the facilities for transportation of raw materials to their plants.

In many of the residence districts of the city and in all the more expensive districts deliveries of bread to the retail stores are made twice a day, and the experience of the large bakeries has been that a five- or six-mile circuit is the most economical area for one plant to cover in making retail deliveries.

In locating their factories in residence districts bakers of bread and cake have made every effort to keep their plants from being in any sense a nuisance in the neighborhood. Space is provided on the street floor of the building within the property line for loading delivery wagons and unloading raw materials. Delivery baskets are never left on the sidewalk, and trucks are not allowed to stand in the streets outside the plant. The buildings are of modern factory type construction, but in most cases an effort has been made to make the exterior more attractive in appearance than the ordinary factory.

The biscuit and cracker bakeries in the region have been more concerned with transportation facilities than have the bread and cake bakeries, partly because their business is conducted on a larger scale and raw materials consequently are received in larger amounts, and partly because a greater proportion of their product is shipped out of town by rail. All the important biscuit and cracker factories in the region have railroad sidings in or beside their plants. In most cases manufacturers of these types of baked goods have paid particular attention to labor supply in choosing their sites. A great many girls and women are needed for sorting and packing the products in these factories, and since the trade has an important seasonal fluctuation, proximity to the sources of labor supply is vital to their effective operation.

The following table, compiled from the records of the Departments of Labor of New York, New

[1] State of New York: Preliminary Report of the Factory Investigating Commission, 1912, Vol. I, p. 235.

Jersey, and Connecticut, shows the movement of the larger bakeries within the entire region since 1900.[1]

TABLE XIX.—DISTRIBUTION AMONG ZONES OF LARGE BAKERIES (20 OR MORE EMPLOYES) IN 1900, 1912, 1917, AND 1922

Year	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III Outlying Region	Total
	Number of establishments			
1900	15	22	4	41
1912	21	38	[a]	59
1917	22	51	5	78
1922	24	64	5	93
	Percentage of establishments			
1900	36.6	53.7	9.7	100
1912	35.6	64.4	[a]	100
1917	28.2	65.4	6.4	100
1922	25.8	68.8	5.4	100
	Percentage of employes			
1900	68.9	26.5	4.6	100
1912	64.7	35.3	[a]	100
1917	57.0	41.0	2.0	100
1922	45.5	52.9	1.6	100

[a] Data probably incomplete.

Confectioneries

According to the census, the manufacture of confectionery in the United States (including confectionery proper, ice-cream, and chewing gum) employed almost 99,000 workers at the time of the 1919 census as compared with 34,000 in 1899. Of this number, 13,000 were located in New York City, 1,000 in Jersey City, and 1,200 in Newark.[1] New York City itself is so important in the industry that it is interesting to review its growth here as compared with the development throughout the United States. The following table sets forth the more important census figures on the subject.

The 1919 production of confectionery, ice-cream, and chewing gum in the larger cities of the region with which this report is concerned appears in Table XXI.

The number of ice-cream establishments in the region is apparently a function of its population, since the expense of delivering ice-cream at long distances is very great and the size of plants is restricted by this factor in production costs. According to the records of the Departments of Labor of New York, New Jersey, and Connecticut there were in 1919 in the area under consideration in this study, 69 plants engaged primarily in the manufacture of ice-cream.[2] Of these only eight had more than 20 employes. With the adoption of improved methods of production and distribution the number of large plants will undoubtedly increase at the expense

[1] Bakeries with less than 20 employes are not included in this table because the records for the earlier years are not complete.

[1] Census statistics for the industry are difficult to use because of the exclusion at different times of different sections of the industry. At the present time statistics for ice-cream, chewing gum, and confectionery are all published separately, but in the early period the three branches were combined and no separate statistics were published for Jersey City or Newark.

[2] In the case of the smaller plants the manufacture of ice-cream and of confectionery proper are sometimes combined.

TABLE XX.—WAGE-EARNERS AND VALUE OF PRODUCT OF CONFECTIONERY ESTABLISHMENTS (INCLUDING CONFECTIONERY PROPER, ICE-CREAM, AND CHEWING GUM) IN UNITED STATES AND IN NEW YORK CITY IN 1899, 1914, AND 1919

Year	Wage-earners [a]			Value (in thousands of dollars)		
	United States	New York City	Per cent in New York City	United States	New York City	Per cent in New York City
1899	33,583	5,536	13.5	81,291	14,484	17.8
1914	64,034	9,669	15.1	226,828	32,870	14.5
1919	98,838	13,139	13.3	688,449	96,904	14.1

[a] Average number employed throughout the year.

of the smaller units, but it does not seem likely that the New York area will ever produce more ice-cream than is consumed within its limits.

TABLE XXI.—VALUE OF PRODUCT [a] OF CONFECTIONERY PROPER, ICE-CREAM, AND CHEWING GUM IN 1919

(In thousands of dollars)

	Confectionery	Ice-cream	Chewing gum
New York City	69,471	15,093	12,339
Bronx	725	312	..
Brooklyn	20,274	5,585	[b]
Manhattan	44,983	8,595	[c]
Queens	3,440	509	[d]
Richmond	49	92	..
Jersey City	3,053	643	..
Newark	3,433	1,317	[e]

[a] Census of Manufactures, 1919.
[b] Value of product of 4 establishments not published separately.
[c] Value of product of 2 establishments not published separately.
[d] Value of product of 2 establishments not published separately.
[e] Value of product of 7 establishments not published separately. There are eight establishments manufacturing chewing gum in the entire state of New Jersey, and the value of their products amounted to $1,332,401 in 1919.

In the case of chewing gum, however, the problem is quite different. The product is valuable in relation to its size, and it will keep for several months without deteriorating in quality. In 1919 New York City produced almost one-quarter of the total output of chewing gum in the United States. The chief raw materials of the industry are sugar and chicle, and since they are both readily available in the vicinity of New York harbor,[1] and since the demand for the product is very large in this district, the location of plants in this region is advantageous. The machinery used in the manufacture of chewing gum is elaborate and expensive, and the contribution of the wage-earners in the industry, therefore, much less important than in most of the food industries. This combination of production factors has tended to develop plants with extensive mechanical equipment and large output.

[1] Chicle is imported largely from Mexico, although some varieties come from Java. In 1921 the total amount imported into the United States amounted to seven million pounds, of which two million pounds entered the country by way of New York harbor.

There were in 1922, 12 factories with 734 employes in this industry, two of these plants having more than 20 employes.

In the case of confectionery proper, the size of plants varies from the cellar factory with one employe to the 11-story factory with 900 employes. The growth in the industry during the war period is well brought out by the census figures in Table XXII.

TABLE XXII.—ESTABLISHMENTS AND WAGE-EARNERS IN THE CONFECTIONERY INDUSTRY (PROPER) [a] IN NEW YORK, JERSEY CITY, AND NEWARK IN 1899, 1904, 1909, AND 1919 [b]

Year	Establishments			Wage-earners		
	New York City	Jersey City	Newark	New York City	Jersey City	Newark
1899	104	[c]	6	4,454	[c]	46
1904	110	4	11	5,431	58	268
1909	127	7	16	6,522	328	381
1919	216	8	13	10,858	507	1,018

[a] Not including ice-cream and chewing gum.
[b] Comparable figures for 1914 are not available.
[c] Figures omitted so as not to disclose individual operations.

There has been a marked falling off in confectionery manufacture throughout the whole country since 1919, and the number of small establishments producing candy has declined in the region under consideration since that time.

Table XXIII sets forth the number and size of establishments producing candy, chewing gum, and ice-cream in New York City in 1900, 1912, 1917, and 1922. It will be observed that along with the growth in the number of small establishments in the city there was an increase in the size of the larger establishments. In 1922 more than 22 per cent of the workers in the industry were employed in factories having more than 500 employes, while in 1900 there were recorded no factories of this size. The decline in the number of plants in the industry in 1917 is to be explained by the fact that the high price of sugar and wartime restriction of its consumption caused certain factories to suspend operations in that year. This was particularly true of the small plant, that is those with less than 20 employes,

TABLE XXIII.—GROWTH OF CONFECTIONERY (PROPER) [a] ESTABLISHMENTS IN NEW YORK CITY [b]

Number of employes per plant	Number of establishments				Per cent of establishments				Per cent of employes			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
1–19	60	577	315	996	55.6	89.9	78.6	90.4	7.0	14.5	9.9	10.9
20–49	17	24	32	47	15.7	3.7	8.0	4.3	9.7	8.4	9.2	10.6
50–99	15	15	30	20	13.9	2.3	7.5	1.8	18.5	11.0	20.2	9.7
100–249	11	20	15	26	10.2	3.1	3.7	2.4	32.2	34.4	21.3	28.0
250–499	5	3	6	7	4.6	.5	1.5	.6	32.6	11.3	20.3	18.2
500–999	..	3	3	5	..	.5	.7	.5	..	20.4	19.1	22.6
Total	108	642	401	1,101	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Not including ice-cream and chewing gum.
[b] From the New York factory inspection records.

which declined from 577 in 1912 to 315 in 1917. After the relaxation of wartime control of sugar consumption the manufacture of candy throughout the country increased greatly, but the industry suffered severe reverses in 1920 when the price of sugar suddenly declined, and at the same time the demand for candy decreased greatly because of the industrial depression of that year.

Establishments manufacturing confectionery may be divided into three types. There are small plants which cater only to the trade of their immediate neighborhood; there are large factories manufacturing chocolates and bonbons requiring much handwork both in production and packing; and there are large factories with extensive mechanical equipment which manufacture candies of types that require little hand labor.

Factories of the first type may be regarded as a function of population. They are scattered all over the city, particularly in the residence districts. Often they are found in connection with a neighborhood candy store which buys its chocolate creams, its bonbons, and its hard candies from the large manufacturers but which conducts a small factory in its own cellar, making candies of the homemade types (caramels, fudge, and so forth) and, not infrequently, ice-cream also.

The location of factories of the second type has largely been determined by their need of large supplies of unskilled labor. The candy industry is one of pronounced fluctuations and is obliged to recruit a new group of workers, girls and women especially, twice a year, once in the late summer and early fall, and again in the weeks just before Easter. A few manufacturers specializing in this type of candy have moved to the outskirts of the city because of high rents in Manhattan, and they have found themselves severely handicapped because of their difficulties in getting labor during the busy seasons.

The item of rent is important in the cost of producing candy of all types, and especially since 1916–1917 there has been a movement among candy producers out of Zone I and into Zone II. The movement would undoubtedly have been stronger if it had not been for the importance of the labor factor to some employers and the desire of others to be near their retail stores. There are in New York and its environs several large confectionery manufacturers who maintain retail stores throughout the expensive residence and shopping districts and the downtown financial district. A desire to be near these stores has held several of the manufacturers within Zone I.

The third type of confectionery plant (i. e., the plant with extensive mechanical equipment and relatively few employes in proportion to the value of its output) is frequently to be found in Zone II. The advantages of the cheaper land in some of the undeveloped sections of the zone, and in some sections its railroad facilities, have outweighed the difficulty of procuring labor in these sections.

Table XXIV, from the factory inspection records, illustrates the movement of the larger plants within the area since 1900.

TABLE XXIV.—DISTRIBUTION AMONG ZONES OF ESTABLISHMENTS AND EMPLOYES IN CONFECTIONERY INDUSTRY (CONFECTIONERY PROPER, ICE-CREAM, AND CHEWING GUM) WITH 20 OR MORE EMPLOYES IN NEW YORK AND ITS ENVIRONS IN 1900, 1912, 1917, AND 1922

Year	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III Outlying Region	Total
		Number of plants		
1900	34	15	1	50
1912	37	32	2	71
1917	51	49	5	105
1922	51	72	7	130
		Percentage of plants		
1900	68.0	30.0	2.0	100
1912	52.1	45.1	2.8	100
1917	48.6	46.6	4.8	100
1922	39.2	55.4	5.4	100
		Number of employes		
1900	3,304	2,010	30	5,344
1912	4,826	3,257	55	8,138
1917	6,225	3,867	103	10,195
1922	6,856	6,709	377	13,942
		Percentage of employes		
1900	61.8	37.6	.6	100
1912	59.3	40.0	.7	100
1917	61.0	38.0	1.0	100
1922	49.2	48.1	2.7	100

It has been possible to assemble complete statistics on all the branches of confectionery production in 1922 for the entire region. These are shown in Table XXV.

Cocoa and Chocolate Factories

The manufacture of cocoa and chocolate products is in many of its branches closely allied with the manufacture of confectionery. Most of the large candy factories import cocoa beans and make chocolate liquor and chocolate coatings for their own use and powdered cocoa for sale. This section of the description of the food industries is concerned, however, only with those establishments which produce cocoa and chocolate products as their chief article of manufacture.

The census reports that the total output of chocolate and cocoa products[1] in the United States amounted to 308,404,865 pounds in 1921[2] and was valued at $77,930,711. As compared with 1919, these figures indicate a decline in the industry amounting to about 25 per cent. In 1919 the States of New York and New Jersey combined produced about 30 per cent of the total output of the country.[3]

In 1921 there were 50 cocoa and chocolate establishments in the United States.[4] Thirteen of these were in New York State, nine each in Massachusetts and New Jersey, and eight in Pennsylvania. Pennsylvania, however, led all the states in value of output.

Of the 13 plants in New York State producing cocoa and chocolate products in 1919, nine are listed by the census as being in New York City. A comparison of the factory inspection records with the census figures indicates that seven of the eight New Jersey plants lie within the limits of New York and its environs. Census figures for the early years are not available for New Jersey, so that it is impossible to make comparisons for this portion of the area over a long period. The census figures for New York City alone are presented in Table XXVI.

The relative position of New York City in the manufacture of chocolate and cocoa products has declined somewhat since the beginning of the century. Because their extensive machinery

[1] Produced in plants engaged primarily in chocolate and cocoa manufacture.

[2] The census does not give the weight of product in 1919. The value of the product in 1919 was $139,258,296, but this figure included some small plants (product between $500 and $5,000) which were excluded from the 1921 figures, and the change in prices makes value of product figures unreliable during these years. The total amount of cocoa beans imported into the United States declined 22 per cent between 1919 and 1921.

[3] New York, $30,863,000; New Jersey, $10,813,000; total $41,676,000. This is 29.9 per cent of the aggregate for the country. The two states produced $3,408,000 worth of milk chocolate. Much of this was made in the dairying sections of up-state New York.

[4] 1921 Census of Manufactures.

TABLE XXV.—ESTABLISHMENTS AND EMPLOYES IN THE CONFECTIONERY INDUSTRY (CONFECTIONERY PROPER, ICE-CREAM, AND CHEWING GUM) IN NEW YORK AND ITS ENVIRONS DISTRIBUTED ACCORDING TO SUBDIVISIONS OF THE AREA AND ACCORDING TO SIZE OF ESTABLISHMENTS IN 1922

Location of plants	Number of establishments (distributed according to number of wage-earners)								Number of employes (distributed according to number of wage-earners)							
	1–19	20–49	50–99	100–249	250–499	500–999	Total	Per cent of total	1–19	20–49	50–99	100–249	250–499	500–999	Total	Per cent of total
Zone I [a]																
Manhattan below 59th Street	465	21	11	12	4	3	516	31.3	623	681	704	1,864	1,540	2,067	7,479	43.8
Zone II																
Bronx	94	2	..	..	..	1	97	5.9	204	63	..	..	..	605	872	5.1
Queens	54	..	..	3	3	..	60	3.6	100	..	..	500	1,016	..	1,616	9.5
Kings	237	21	7	10	..	1	276	16.8	348	644	514	1,451	..	515	3,472	20.3
Richmond	3	..	..	..	..	..	3	.2	5	..	..	..	..	..	5	.0
Upper Manhattan	143	3	2	1	..	..	149	9.0	255	105	154	127	..	..	641	3.8
Westchester (Part)	5	1	..	..	..	..	6	.4	12	29	..	..	..	..	41	.2
Jersey City	88	2	2	..	..	..	92	5.6	307	51	110	..	..	..	468	2.7
Newark	11	..	3	2	..	..	16	1.0	102	..	175	282	..	..	559	3.3
Other Essex County	36	2	..	..	..	..	38	2.6	97	69	..	..	..	..	166	1.0
Other Hudson County	81	2	2	..	..	..	85	5.2	258	63	126	..	..	..	447	2.6
Union County	40	..	..	..	..	..	40	2.4	107	..	..	..	..	..	107	.6
Passaic (Part)	50	..	..	..	..	..	50	3.0	165	..	..	..	..	..	165	1.0
Middlesex (Part)	15	..	1	..	..	..	16	1.0	44	..	55	..	..	..	99	.6
Bergen (Part)	..	..	1	..	..	..	1	.1	..	..	55	..	..	..	55	.3
Zone III																
Surrounding area	189	5	1	1	..	..	196	11.9	503	134	74	169	..	..	880	5.2
Total	1,511	59	30	29	7	5	1,641	100.0	3,130	1,839	1,967	4,393	2,556	3,187	17,072	100.0

[a] For definition of zones see Diagram I.

TABLE XXVI.—COCOA AND CHOCOLATE MANUFACTURING IN NEW YORK CITY AND ITS RELATION TO THAT OF THE UNITED STATES, 1899–1921

Year	Number of establishments, New York City	Per cent of entire country	Number of wage-earners,[a] New York City	Per cent of entire country	Value of product, New York City	Per cent of entire country
1899	9	37.5	546	41.6	$2,099,872	21.7
1904	9	36.0	691	33.1	3,411,000	23.7
1909	8	29.6	602	21.3	4,673,000	20.9
1914	8	22.2	621	14.9	5,826,000	16.3
1919	9	18.8	1,584	17.4	24,486,318	17.6
1921	[b]	[b]	1,506[c]	23.8	[b]	[b]

[a] Average number employed during the year.
[b] Not available.
[c] Not including wage-earners in plants reporting less than $5,000 worth of products.

requires large floor space, rent is an important item to chocolate manufacturers and the rising cost of land in New York City has encouraged manufacturers building new plants to locate them outside the city limits. Thus, from 1899 through 1914 there was a steady decline in the percentage of wage-earners in the industry who were located in New York City, although the change in the actual number was inconsiderable. Wartime demand for chocolate bars and post-war demands for all kinds of candy caused an increase in production within the city after 1914, and New York's percentage of the total number of wage-earners engaged in manufacturing chocolate and cocoa products rose from 14.9 per cent in 1914 to 17.4 per cent in 1919. Since that time the New York plants have carried on those in other parts of the country.

The high cost of the machinery used in the manufacture of cocoa and chocolate products has in general kept the small-scale producer from attempting to enter the business. At the present time the cost of the machine used for grinding cocoa beans is $90,000. The result is that cocoa and chocolate manufacture, in contrast to confectionery manufacture, is concentrated in a small number of large establishments with extensive mechanical equipment and relatively few wage-earners.

Table XXVII gives some indication of the size of establishments in this industry.

No single factor of outstanding importance can be cited which will explain the location of cocoa and chocolate plants within the New York region. None of the plants located in Zones I and II has a railway siding running into its building and none of them is located on the waterfront. Such locations seem not to have been necessary, largely because of the fact that the raw materials of the industry are fairly easy to transport by truck.

The two most important raw materials are cocoa beans and sugar. In 1919 plants in New York State consumed 77,254,798 pounds of cocoa beans and 35,923,199 pounds of sugar, and plants in New Jersey consumed 39,755,647 pounds of cocoa beans and 4,273,735 pounds of sugar.[1] Both these materials are readily available in New York City. The sugar is, of course, refined here, and although cocoa beans come to this country from a variety of sources (the chief being British West Africa, Brazil, Ecuador, and Trinidad), almost all of it is imported through New York harbor.

Table XXVIII, compiled from the factory inspection records, shows the movement within the region since 1900. The increasing importance of Manhattan south of 59th Street, as gauged by the number of employes, is interesting, particularly in view of the reduction in the number of plants. The plant which appears in Zone III for

[1] 1919 Census of Manufactures.

TABLE XXVII.—GROWTH OF PLANTS MANUFACTURING COCOA AND CHOCOLATE PRODUCTS IN NEW YORK AND ITS ENVIRONS, 1900, 1912, 1917, AND 1922[a]

Number of employes per plant	Number of establishments				Per cent of establishments			Per cent of employes		
	1900	1912	1917	1922	1900	1917	1922	1900	1917	1922
1–19	2	[b]	3	8	25.0	16.7	38.1	10	2	4
20–49	5	4	6	6	62.5	33.3	28.6	63	15	15
50–99	1	..	4	3	12.5	22.2	14.3	27	17	13
100–249	..	4	4	3	..	22.2	14.3	..	48	35
250–499	..	1	1	1	..	5.6	4.8	..	18	33
Total with more than 20 employes	6	9	15	13	75.0	83.3	61.9	90	98	96
Grand total	8	[b]	18	21	100.0	100.0	100.0	100	100	100

[a] From the factory inspection records of New York, New Jersey, and Connecticut.
[b] Figures not available.

the first time in 1912 is one which moved from Zone I. This move was caused, according to the testimony of officers of the plant in question, by a need for more land and by high land values in Manhattan.

TABLE XXVIII.—DISTRIBUTION AMONG ZONES OF PLANTS OF MORE THAN 20 EMPLOYES MANUFACTURING CHOCOLATE AND COCOA PRODUCTS IN 1900, 1912, 1917, AND 1922

Year	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III[a] Outlying Region	Total
	Number of plants			
1900	2	4	..	6
1912	1	7	1	9
1917	4	10	1	15
1922	2	10	1	13
	Per cent of employes			
1900	31.3	68.7	..	100
1912	24.9	62.5	12.6	100
1917	33.3	53.8	12.9	100
1922	36.7	51.2	12.1	100

[a] The Zone III plant was omitted from Diagram II due to an error in transmitting the records.

Coffee, Tea and Spice Establishments

There would seem at first glance to be small reason for considering as one industry, tea packing, coffee roasting and grinding, and spice roasting and grinding. As a matter of fact, however, these three operations are very frequently carried on by the same concern and in the same building. The materials are imported from widely scattered countries. The tea consumed in the United States comes largely from China, Java, and India, spices from the East Indies and India, and coffee largely from South America, predominantly from Brazil. The only processes to which the tea is subjected in this country are those of blending and packing. The coffee is roasted, blended, ground, and packed. The spices are roasted, ground, and packed. The unifying factor is that they all go to the consumer through the grocery store. This has made it economical for them to be prepared in the same establishments. Many wholesale grocers have become in fact manufacturing grocers as well.

In general, however, it is only the large establishments which combine the three branches. Others are, as a rule, content to confine themselves to the preparation of a single commodity. Thus in 1922 there were in the area which this study covers 43 concerns which roasted coffee and did nothing else, 12 which devoted themselves exclusively to the preparation of spices, six which did nothing but blend and pack tea, and nine which combined two or more of these occupations, or as in the case of a large coffee roaster and sugar refiner, combined one of them with some other occupation outside this group. It should be noted, however, that of the 4,210 persons employed in the preparation of coffee, tea, and spices as reported by the factory inspectors in 1922, 3,011 were employed in the nine establishments of the composite type last named.

It is impossible to estimate the amount of tea packing which is done in the area, as no census statistics are available on the subject and the figures on foreign trade in tea would give no sufficiently accurate indication. Statistics on the value of the product of spice and coffee roasters are published by the census, however, but for the City of New York only, in spite of the fact that there are important plants in Jersey City and Newark.

TABLE XXIX.—VALUE OF PRODUCT OF COFFEE AND SPICE ROASTERS IN NEW YORK CITY

Year	Value (in thousands of dollars)	Proportion of value of product of entire United States (per cent)	Proportion of value of total food production in New York City (per cent)
1900	21,346	31	8
1905	25,807	31	12
1909	15,819	14	6
1914	29,861	20	9
1919	51,225[a]	17	8

[a] This increase represents primarily an increase in monetary value, not in quantity of coffee roasted. The price of coffee in New York rose 60 per cent from 1914 to 1919; the price of Singapore pepper, 72 per cent.

The decline of New York City as the predominant coffee roasting center of the United States

is to be accounted for (except in 1909 which was an unusual year) more by the development of coffee roasting throughout the country, as the popularity and general use of coffee have increased, than by a decline in coffee roasting in the city itself. As the consumption of coffee has grown, and wholesale grocers have sold more and more of it, many of them have felt that it would be more profitable to do coffee roasting themselves than to buy from roasters in New York. Other centers of population like St. Louis, Toledo, and San Francisco have come to have large coffee roasting establishments of their own, and the relative importance of New York has therefore declined. Table XXX gives the census valuation of the product of five principal coffee and spice roasting states in 1919 as compared with their production in 1900, and will illustrate the change which has taken place.

TABLE XXX.—VALUE OF COFFEE AND SPICES ROASTED AND GROUND IN THE FIVE STATES MOST IMPORTANT IN THE INDUSTRY IN 1900 AND 1919

State	1900		1919	
	Value (in thousands of dollars)	Percentage of total for the United States	Value (in thousands of dollars)	Percentage of total for the United States
New York..	22,471	32.32	57,123	18.74
Illinois.....	12,708	18.28	38,189	12.53
Missouri....	5,266	7.57	30,071	9.87
Ohio.....	5,850	8.41	29,271	9.60
California..	3,136	4.51	26,311	8.63
Other states	20,096	28.91	123,827	40.63
Total, United States.	69,527	100.00	304,792	100.00

Unfortunately, production figures in terms of pounds are not available for this group of industries, and in the case of tea and spices, foreign trade figures, which are published on a quantity basis, are not particularly illuminating. As regards coffee, however, the foreign trade statistics reveal an interesting situation. The development of large coffee roasting establishments in the Middle West has diverted a considerable portion of the green coffee which was once imported through New York harbor to other ports, notably to New Orleans, although in recent years Galveston and Boston have also increased their imports. During the ten-year period 1889 to 1899, New York imported on the average 546 million pounds of coffee annually, or 86 per cent of total imports into the country. During the period 1910 to 1919, New York's imports averaged 690 million pounds, but only 65 per cent of the total United States imports. On the other hand New Orleans, which between 1890 and 1899 imported annually only 41 million pounds on the average (6 per cent of total imports), rose in importance until between 1910 and 1919 that port received average annual imports of 283 million pounds, or 28 per cent of the total imports of coffee of the entire United States.

When the figures for the intervening decade, 1900–1909, are brought into the picture, it appears that New York may be already declining absolutely as well as relatively as a coffee importing center. During these years it received on the average 728 million pounds annually, substantially more than during the decade 1910–1919.

The census data regarding the number of wage-earners engaged in this field in New York City, as shown in Table XXXI, reveal surprisingly slight variations from period to period.

TABLE XXXI.—NUMBER OF WAGE-EARNERS ENGAGED IN COFFEE AND SPICE ROASTING AND GRINDING IN NEW YORK CITY, 1900–1919

Years	Number of wage-earners
1900	1,427
1905	1,475
1909	1,329
1914	1,577
1919	1,516

The factory inspection records show a slight increase in the number of employes engaged in coffee and spice roasting and tea packing from 1900 through 1922 in New York and its environs as a whole.

The location of the coffee, spice, and tea establishments in the New York area is greatly influenced by transportation facilities. Since all of the raw materials of these industries come to

the city by way of the sea, and since at least half their products are intended for out-of-town consumption, easy access to the waterfront and to the railroads has proved to be of predominant importance. However, it is not necessary for them to be located at the docks, although it is desirable. The number of these establishments actually on the waterfront is small. In the earlier years the plants were concentrated on Manhattan below 59th Street, the majority scattered near the east and west waterfronts below Chambers Street, and in Brooklyn in the vicinity of Turman Street. As the industry has grown, however, there has also been a development in New Jersey and a movement out of Manhattan. At the present time, approximately as many employes are engaged in the preparation of coffee, tea, and spices in the Jersey waterfront towns as in Brooklyn. In 1922, 88 per cent of the employes in the large plants (with more than 20 employes) were working in plants located in Zone II, as compared with only 47 per cent in 1900.

The development of the three industries under consideration in the years since 1900, as measured by the number of persons engaged in them, is set forth in Table XXXIII.

It is evident from these figures that the recent decline in the number of the plants has been accompanied by an increase in size.

TABLE XXXII.—DISTRIBUTION AMONG ZONES OF ESTABLISHMENTS WITH 20 OR MORE EMPLOYES ENGAGED IN THE PREPARATION OF COFFEE, TEA, AND SPICES IN NEW YORK AND ITS ENVIRONS IN 1900, 1917, AND 1922

Year	Zone I Manhattan South of 59th Street	Zone II[a] Twenty-mile Industrial Zone	Total
	Number of plants		
1900	13	6	19
1917	28	6	34
1922	13	16	29
	Percentage of plants		
1900	68	32	100
1917	82	18	100
1922	45	55	100
	Percentage of employes		
1900	53	47	100
1917	41	59	100
1922	12	88	100

[a] There were no plants of this type in Zone III.

TABLE XXXIII.—GROWTH OF PLANTS IN THE COFFEE, TEA, AND SPICE INDUSTRIES IN NEW YORK AND ITS ENVIRONS, 1900, 1912, 1917, AND 1922

Number of employes per plant	Number of establishments				Percentage of establishments			Percentage of employes		
	1900	1912	1917	1922	1900	1917	1922	1900	1917	1922
1–19	49	[a]	64	42	72.1	65.3	58.0	19.1	12.0	8.0
20–49	10	15	23	22	14.7	23.5	31.0	14.9	16.8	16.0
50–99	3	2	6	1	4.4	6.1	1.0	9.3	11.1	1.0
100–249	4	3	2	2	5.9	2.0	3.0	26.2	6.5	10.0
250–499	2	2	2	3	2.9	2.0	4.0	30.5	13.9	21.0
500 and over	..	..	1	2	..	1.1	3.0	..	39.7	44.0
Total plants with less than 20 employes	49	[a]	64	42	72.1	65.3	58.0	19.1	12.0	8.0
Total plants with 20 employes or more	19	22	34	30	27.9	34.7	42.0	80.9	88.0	92.0
Grand total	68	[a]	98	72	100.0	100.0	100.0	100.0	100.0	100.0

[a] Figures are not available for plants with less than 20 employes in 1912.

Other Food Manufacturing Establishments

In 1922 food manufacturing plants in New York and its environs, not already discussed in this monograph, numbered 996 with 20,321 employes. They included factories manufacturing beverages of various sorts, macaroni, pickle and preserve factories, plants manufacturing artificial ice, milk pasteurizing plants, and one large factory producing sugar and syrup from corn. The last named plant is the largest single establishment included in this group at the present time. The most important subdivisions within this group are shown in Table XXXIV.

The fourth type of plant in this group includes those devoted to handling dairy products. Most of these establishments are milk pasteurizing plants. The marked increase in their number from 1900 to 1917 was due to the activities of the Health Department in those years in educating the producers and the public as to the food value of milk and the dangers involved in using milk not produced and handled under sanitary conditions. In the year 1912 the Department first required all milk brought into the city to be graded according to fat content and according to the method of its production. This ruling made it necessary to pasteurize milk not produced under certain specified conditions with especially rigid dairy inspection, or to label it "Grade C—For Cooking and Manufacturing Purposes Only." All stores which sold this class of milk were obliged to display a warning sign to that effect. The report of the Department for the year 1911–1912 says in regard to this ruling:[1]

> "The fundamental object of the grading system is to extend the scope of pasteurization, an expedient which modern knowledge of the transmission of infectious diseases shows to be absolutely necessary in a great city drawing its milk supply from distant points. . . . At the end of 1912 about one hundred pasteurization plants are either in actual operation or soon to be completed including those in the city and those in the country districts, and from one-third to one-half of the milk supply is pasteurized."

[1] Annual Report of the Department of Health of the City of New York, 1911–1912, p. 13.

TABLE XXXIV.—PLANTS AND EMPLOYES IN THE IMPORTANT MISCELLANEOUS FOOD MANUFACTURING ESTABLISHMENTS IN NEW YORK AND ITS ENVIRONS IN 1900, 1912, 1917, AND 1922

(Plants with less than 20 employes excluded)

Product	Number of plants				Number of employes			
	1900	1912	1917	1922	1900	1912	1917	1922
Beverages	138	110	91	60	8,367	8,457	5,152	3,007
Artificial ice	6	19	18	37	494	575	553	1,467
Macaroni	6	7	15	8	303	685	708	476
Dairy products	4	17	36	32	325	824	1,459	2,375
Total	154	153	160	137	9,489	10,541	7,872	7,325

The marked falling off in the number of establishments and in the number of wage-earners recorded as engaged in manufacturing beverages is due, of course, to the prohibition amendment to the Federal Constitution. At least part of the increase in the number of plants manufacturing artificial ice is connected with this same amendment, as it has been found possible to convert the machinery of the breweries into machinery for ice making.

It will be noted that the decline in the number of macaroni plants in the region was very marked from 1917 to 1922. This decline seems to have been due in large part to the decline in Italian immigration and to the consequent decline in the number of Italians in this region, and in particular to the number of those recently arrived who are inclined to adhere closely to the food habits of their own country.[1]

[1] The number of Italians in Greater New York declined from 401,361 in 1910 to 390,832 in 1920.

Much of the city's milk supply is still pasteurized in the country districts where it is produced, but the largest pasteurizing plants are located within the city itself. The number in New York and its environs increased to 32 in 1913.[1] The decline in the number of plants since 1917 is much more than compensated by the material increase in their size.

The following tables indicate the size and the location of all the plants manufacturing foods in the New York region which have not been discussed in earlier sections of this chapter. It is evident that there has been only a slight increase in size of plants, and that the most pronounced growth has been in Zone II. The decline in Manhattan below 59th Street was caused principally by the closing of the breweries.

and the fact that they are spread very evenly through the densely populated and poor districts of the city. The correspondence between population and numbers of small plants would doubtless be much greater if the inspection included manufacturing establishments with no wage-earning employes. These "proprietor shops," which are manned entirely by the proprietor and his family, are very common in all the poorer districts of the city; and if they were included in the record there would probably be a very high correlation between population and number of small food manufacturing establishments.[1] The data relating to these small food manufacturing plants for 1922 are summarized in Table XXXVI. It will be seen that bakery and confectionery plants are by far the most

TABLE XXXV.—GROWTH AND DISTRIBUTION AMONG ZONES OF ESTABLISHMENTS WITH 20 OR MORE ENGAGED IN MANUFACTURING MISCELLANEOUS FOOD PRODUCTS IN NEW YORK AND ITS ENVIRONS IN 1900, 1912, 1917, AND 1922

Number of employes per plant	Number of establishments				Per cent of establishments				Per cent of employes			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
20–49	116	110	161	128	55.2	48.0	65.2	58.2	25.9	18.7	30.3	24.2
50–99	57	68	50	57	27.2	29.7	20.3	25.9	27.4	26.4	22.6	25.2
100–249	29	39	29	27	13.8	17.0	11.7	12.3	28.6	32.8	26.1	28.1
250–499	8	12	5	6	3.8	5.3	2.0	2.7	18.1	22.1	43.8	12.1
500–999	..	..	2	2	..	..	.8	.9	..	..	7.2	10.4
1,000 and over	..	..	..	..	..	..	..	..	..	..	..	..
Total	210	229	247	220	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Distribution among zones												
Zone I	80	79	101	55	38.1	34.5	40.9	25.0	40.4	30.7	31.9	22.2
Zone II	114	131	132	150	54.3	57.2	53.4	68.2	46.4	59.0	61.8	71.9
Zone III	16	19	14	15	7.6	8.3	5.7	6.8	13.2	10.3	6.3	5.9
	210	229	247	220	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Distribution of Small Food Plants

Diagram VI shows, for a portion of New York City, the location of food manufacturing plants with less than 20 employes, recorded by the factory inspectors. A glance at this map is sufficient to show the wide scatter of these plants numerous and employ the largest number of workers.

[1] Ibid., 1913, p. 47.

[1] As the records stand, the coefficient obtained by correlating population and number of food manufacturing plants per sanitary district for the east side of Manhattan was .4—(with a probable error of .07). The sanitary districts used for this correlation were all those east of Third Avenue south to Third Street and east of the Bowery from Third Street south to Division Street.

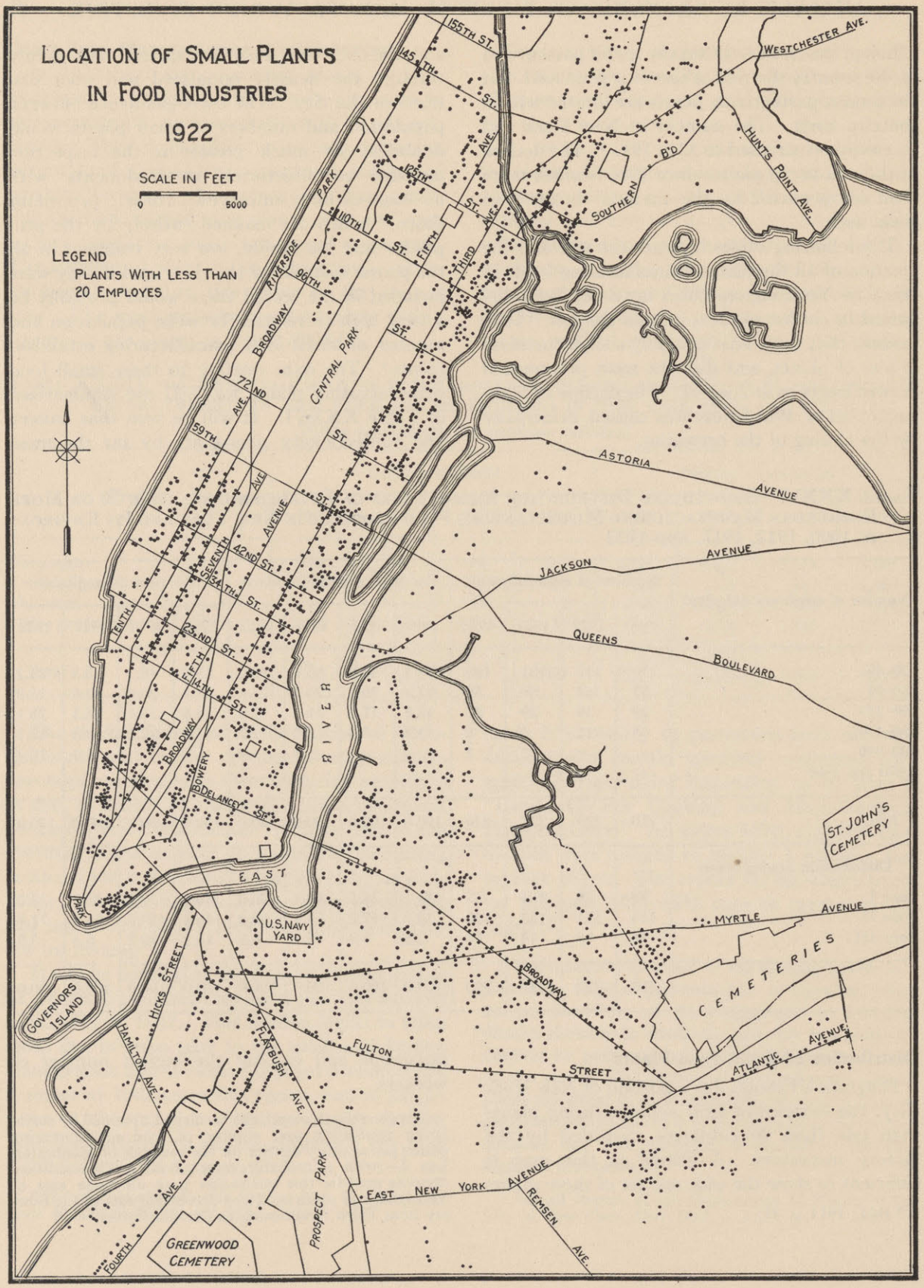

DIAGRAM VI
Location of Small Plants in Food Industries—1922

TABLE XXXVI.—NUMBER OF SMALL PLANTS (LESS THAN 20 EMPLOYES) AND EMPLOYES IN SUCH PLANTS IN VARIOUS BRANCHES OF FOOD MANUFACTURING INDUSTRIES IN NEW YORK AND ITS ENVIRONS IN 1922

Branch of industry	Number of establishments				Number of employes			
	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III Outlying Region	Total	Zone I Manhattan South of 59th Street	Zone II Twenty-mile Industrial Zone	Zone III Outlying Region	Total
Bakery products	324	2,552	622	3,498	1,133	8,087	1,675	10,895
Confectionery	465	857	189	1,511	623	2,004	503	3,130
Beverages	53	198	56	307	351	820	188	1,359
Artificial ice	9	67	38	114	63	608	267	938
Meat products	50	34	13	97	319	211	101	631
Dairy products	23	20	19	62	150	155	124	429
Coffee, tea and spices	33	9	..	42	294	38	..	332
Macaroni	9	56	6	71	37	227	6	270
Chocolate and cocoa	1	7	..	8	8	54	..	62
Other food products	83	109	29	221	573	629	188	1,390
Total	1,050	3,909	972	5,931	3,551	12,833	3,052	10,436

FACTORS AFFECTING THE DISTRIBUTION, GROWTH, AND MOVEMENT OF THE FOOD MANUFACTURING INDUSTRIES AS A WHOLE

Having discussed the various branches of the industries, attention is now directed to certain aspects of the problem which can be discussed in terms of the industry as a whole.

Distribution of the Industries Throughout the Area

The development of the industries in the three zones into which the area has been divided can be studied by referring to the graph shown in Diagram I,[1] the maps shown in Diagrams II, III, and IV,[2] and the data regarding the number of plants given in Table XXXVII.[3]

The region of greatest growth has been Zone II, the Twenty-mile Industrial Zone and it is, perhaps, significant that in this zone there has been the greatest population increase during the period. Manhattan below 59th Street has a slightly smaller number of large plants (20 employes or more) than in 1912, and a substantially smaller number than in 1917. However, its crowded residence districts and its effective connections with the residence districts in the outlying regions have continued to hold there important food manufacturing plants when their success depends in large measure either on their ability to deliver food products quickly over a large area, or on their ability to procure large numbers of unskilled workers.

[1] See page 12. [2] Pages 15, 16, and 17.

[3] See also the discussion of the various branches of food manufacture, pages 15–43.

TABLE XXXVII.—FOOD MANUFACTURING PLANTS WITH 20 OR MORE EMPLOYES IN NEW YORK AND ITS ENVIRONS IN 1900, 1912, 1917, AND 1922, DISTRIBUTED BY ZONES

	1900	1912	1917	1922
Zone I, Manhattan South of 59th street	160	185	230	181
Zone II, Twenty-mile Industrial Zone	169	230	272	347
Zone III, Outlying Region	23	24	29	34
Total	352	439	531	562

Increase in the Size of Plants

Although the number of food manufacturing plants in New York and its environs has increased only 60 per cent since 1900, the manufacture of food within the area has probably increased more than that because of the increase in the size of plants. Table XXXVIII gives the

TABLE XXXVIII.—SIZE OF FOOD MANUFACTURING PLANTS WITH 20 OR MORE EMPLOYES IN NEW YORK AND ITS ENVIRONS BY ZONES IN 1900, 1912, 1917, AND 1922

Number of employes per plant	Number of plants															
	Zone I Manhattan South of 59th Street				Zone II Twenty-mile Industrial Zone				Zone III Outlying Region				Total			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
20–49	76	90	143	103	95	96	148	184	13	14	24	25	184	200	315	312
50–99	45	50	46	39	43	72	71	83	4	3	2	4	92	125	119	126
100–249	31	34	32	25	19	39	35	53	2	6	2	4	52	79	69	82
250–499	7	7	5	9	9	13	7	15	3	1	1	1	19	21	13	25
500–999	..	3	3	4	2	8	7	7	1	..	..	..	3	11	10	11
1,000 and over	1	1	1	1	1	2	4	5	..	..	..	..	2	3	5	6
Total	160	185	230	181	169	230	272	347	23	24	29	34	352	439	531	562

TABLE XXXIX.—SIZE OF FOOD MANUFACTURING PLANTS OF ALL SIZES IN NEW YORK CITY IN 1900, 1912, 1917, AND 1922

Number of employes per plant	Number of establishments				Per cent of establishments				Per cent of employes			
	1900	1912	1917	1922	1900	1912	1917	1922	1900	1912	1917	1922
1–19	3,200	4,197	4,702	5,931	90.0	92.3	89.9	91.4	36.8	35.9	25.2	16.7
20–49	186	170	315	311	5.2	3.7	6.0	4.8	12.2	9.5	14.1	12.5
50–99	93	101	119	125	2.6	2.2	2.3	1.9	13.0	12.2	13.2	11.6
100–249	52	60	69	82	1.5	1.3	1.3	1.2	17.3	16.4	17.2	18.5
250–499	20	14	11	25	.6	.3	.2	.4	13.9	8.3	9.5	12.4
500–999	2	6	8	11	.05	.15	.2	.2	..	6.7	6.0	9.9
1,000 and over	2	2	5	6	.05	.05	.1	.1	6.8	11.0	14.8	18.4
Total	3,555	4,550	5,229	6,491	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

size of the larger food manufacturing plants in the entire region and in each zone as measured by the number of employes. It will be observed that on Manhattan south of 59th Street there were 39 plants employing 100 or more workers in 1900 and the same number in 1922. During the same period in Zone II the number of such plants increased from 31 to 80.

The element of inaccuracy in the data relating to small food plants outside New York City has already been mentioned.[1] The facts relating to plants of all sizes for New York City alone, presented in Table XXXIX, indicate that the very large plants (those employing more than 500) now constitute a more important factor in the trade than was the case in 1900.

Relative Contribution of Machinery and Workers

Although there has been marked progress in the past twenty years in the development of machinery for the manufacture of food products, human labor is still an extremely important factor in most of the food industries. The term "value added by manufacture," as it is used by the census, indicates the difference between the value of the finished products of an industry and the cost of its raw materials. If this difference is divided by the number of wage-earners in the industry the quotient furnishes an indication of how much human labor is supplemented by machinery in that particular branch of manufacture.[2]

[1] See page 14.

[2] Leaving out of consideration differences in skill, which are relatively unimportant in the food industries.

TABLE XL.—VALUE ADDED BY MANUFACTURE PER WAGE-EARNER IN VARIOUS BRANCHES OF FOOD INDUSTRIES OF NEW YORK, NEW JERSEY, AND CONNECTICUT IN 1919[a]

Product	Value added
Confectionery	$2,671
Bakery products—except biscuits and crackers	3,300
Biscuits and crackers	3,374
Chocolate and cocoa products	3,450
Meat	3,506
Refined sugar	3,660
Ice-cream	3,963
Coffee and spices	4,361
Chewing gum	6,627

[a] Compiled from the United States Census of Manufactures for 1919. The figures for the states of New York, New Jersey, and Connecticut were chosen rather than the figures for the larger cities in the region under consideration, since plants with extensive mechanical equipment and relatively few employes are frequently located in the smaller towns and cities for which no census figures are published. On this account the statistics of the three states seem to be more typical of the industry of the entire region than statistics for the larger cities.

An examination of Table XL seems to show that in 1919, among the food manufacturing industries in New York and its environs, the contribution of workers was most important in candy making and least important in the manufacture of chewing gum, and that slaughtering and meat packing occupied a median position. Cocoa and chocolate products seem to be placed too high in the list, probably because some confectionery manufacture is included in the census material for this industry.[1]

[1] See page 34.

Sex, Age, and Skill Required in Food Workers

Sugar refining, slaughtering and meat packing, and bread baking are branches of the food industries which utilize the services of men almost exclusively. Much of the work in these lines requires great physical strength. On the other hand the candy making, cake baking, biscuit and cracker baking branches make use of the services of large numbers of women and girls. In New York City the number of men in the food industries is about two and a half times the number of women; but the women wage-earners assume a disproportionate importance partly because the industries in which they are most employed (biscuit and cracker baking and candy making) are of a seasonal nature and it is necessary to recruit women and girl workers twice a year, and partly because of the large turnover among the girls and women employed in these industries even in the busy seasons.

The subdivision of production has probably been carried to its highest point in the slaughterhouses where there are as many as 40 separate operations in the process of killing and dismembering an animal. Most of the operations can be learned quickly, and the chief requirements for the workers are physical strength and insensitivity to unpleasant sights and odors.

There are relatively few highly skilled trades in the food industries. The highest paid workers in the group are probably the bakers of fancy pastries, artists in food, who receive wages varying from $70 to $110 a week. The bakers of fancy crackers are also experts, while ordinary bread and cake bakers, candy makers, chocolate and bonbon dippers come next in that order. Among the packing house employes a few, although not many, are highly skilled, but here, as in most of the trades mentioned, the work can be learned in less than a year. In coffee roasting

TABLE XLI.—NUMBER, SEX, AND AGE OF THE WAGE-EARNERS IN THE FOOD INDUSTRIES OF NEW YORK CITY, 1919 [a]

Product	Average number	Number on December 15th or nearest representative day				
		Total	Age 16 and over		Age under 16	
			Male	Female	Male	Female
Refined sugar [b]	6,289	6,020	5,499	521	..	..
Biscuits and crackers	8,721	8,604	4,506	4,080	7	11
Other baked foods	13,017	14,000	12,424	1,554	16	6
Cheese	6	6	5	1	..	..
Chewing gum	767	755	318	424	..	13
Chocolate and cocoa preparations	1,584	1,519	1,250	264	2	3
Coffee and spices	1,516	1,570	955	614	1	..
Confectionery	10,858	11,188	4,306	6,849	8	25
Ice-cream	1,514	1,509	1,304	202	3	..
Cordials and flavoring syrups	121	123	110	13	..	..
Macaroni, vermicelli and noodles	760	806	664	140	2	..
Flavoring extracts	288	311	159	152	..	..
Artificial ice	1,371	1,380	1,350	1	29	..
Liquors, malt	4,245	4,065	4,037	28	..	..
Preserves	1,006	1,200	420	763	5	12
Pickles and sauces	647	649	337	312	..	..
Sausages	325	362	348	13	1	..
Meat products	4,457	4,497	4,464	33	..	..
Other food products	1,328	1,435	951	480	1	3
Total	58,820	59,999	43,407	16,444	75	73

[a] United States Census of Manufactures, New York State, 1919.
[b] Includes two refineries in Yonkers.

the number of skilled employes is very small, and the same is true of chocolate and cocoa manufacture.

There is an effort in all the large factories to subdivide the manufacturing process as much as possible so that each task can be learned quickly and easily, and wherever it is possible workers have been replaced by machines. A chocolate-dipping machine invented about 1900 and improved since that time has practically done away with hand dipping in making the cheaper grades of chocolates. The more expensive grades are still dipped by hand, however, partly because it is possible to get a thicker coating of chocolate by the hand-dipping process, partly because it is possible by this process to add decorations which the machine cannot produce, and partly because the buyers of expensive confectionery pay more for a product dipped by hand, as a matter of custom. In the larger bakeries many of the processes of bread and cake baking formerly done by hand are now performed by machinery.

Seasonal Variations

The seasonal fluctuations in the manufacture of food products are in some cases the result of the seasonal preferences of consumers, and in others of seasonal supply of raw materials. The periods of greatest activity in the cracker and candy factories are the result of the increased consumption of crackers in the summer and of candy in the winter and spring. On the other hand, variations in the preparation of sugar and coffee, and in the preserving of fruits and vegetables, come about because of variations in the supply of raw materials. The statistics available on the subject are in some respects very unsatisfactory. The Bureau of the Census publishes figures giving the month of maximum employment and the month of minimum employment for all the important industries under consideration in this study; but in publishing figures of numbers of wage-earners employed during each of the twelve months of the year, statistics for some of the industries have been combined in such a way as to obscure the most pronounced variations.

Seasonal fluctuations are more extreme in the preserving of fruits and vegetables than in any other food industry. The figures for the region which we are considering are not published separately, but for New York State the minimum employment in 1919 in the month of February was 958, or 10 per cent of the maximum employment for that year. This industry is not, however, relatively of great importance in New York and its environs.

Of the food industries which employ large numbers of workers within the New York region the greatest variation occurs in sugar refining. The variations in employment coincide fairly closely with the variations in the volume of imports of sugar during the year.[1] The low period of the year comes in December and January, and the period of greatest activity in the spring and summer. In 1919 the sugar refineries of New York State employed in their lowest month 70.3 per cent of the number of workers employed in their highest month.

Census statistics on monthly employment in the confectionery industry are combined with statistics on the employment in the ice-cream industry. Since the high point in the manufacture of ice-cream comes in midsummer, and the high points in the manufacture of candy in the fall and early winter and in the weeks just before Easter, the combined figures obscure the situation they are intended to portray. The figures on the employment of women in manufacturing confectionery and ice-cream may be used, however, as an index of employment in candy manufacture, since there are relatively few women employed in the making of ice-cream. In 1919 these plants employed 74.6 as many women workers in their lowest as in their highest month. The periods of activity in candy making are the winter months in general and particularly the weeks just before Christmas and just before Easter. The period of relative inactivity is summer. Even under the modern methods of candy manufacture and storage[2] it is not possible

[1] The import statistics show that receipts of raw sugar are usually heaviest between February and August and lowest in December and January. The 1919 figures for monthly employment give December as the low month and July as the high.

[2] Candies are stored at a temperature of about 60 degrees Fahrenheit.

to make hard candy, chocolates, and bonbons more than a month or six weeks before they are to go to the consumer, and candy of the home-made type should be delivered within a week after manufacture. Seasonal manufacture in candy making seems, therefore, to be inevitable, as the public's preference for much candy in the winter and less in the summer seems to have a sound physiological foundation.

Figures on monthly employment are again combined by the census in the case of the biscuit and cracker and bread and cake baking industries, obscuring in this instance the seasonal variation in cracker and biscuit manufacture. The high point in baking crackers and biscuits comes, as a rule, in the summer months, when people eat sweet crackers with their ice-cream and carry biscuits and crackers to picnics. There have been in recent years, however, deviations from this rule.

If the figures available on seasonal fluctuations for all of the food industries in the region are combined,[1] the plants as a whole are found to employ in their least active month 82.1 per cent of the number employed in their most active month.

Trade Unions

In certain lines of industry the labor organizations play an important rôle in the discussion of the causes of migration. Trade unionism has not prospered among the workers in the food manufacturing industries, partly because so much of the work requires little or no skill and new workers can be trained so easily to take the places of those who would attempt to control the labor policy of the industry, and partly because there are so many women and girl workers in the seasonal branches of the food industries. Girls are notoriously hard to organize, and in unskilled work, like sorting nuts or raisins for candy making or like packing crackers in pasteboard boxes, it is possible to recruit a new group every year, or each month if necessary. There are three international unions affiliated with the American Federation of Labor in the food manufacturing industries—the Bakery and Confectionery Workers,[1] the Brewery Workmen, and the Meat Cutters and Butchers—one national union not affiliated with the American Federation of Labor, the International Workers in the Amalgamated Food Industries, and one local union, the Independent Butchers Union, which is confined to the New York region only.

Employe Residence in Its Relation to the Location of Manufacturing Plants

The peculiar dependence of several of the most important food industries of the region upon a large supply of unskilled labor at different seasons of the year has led to the inclusion within this volume of an investigation of the relation of the residence of employes to their place of work, and of the location of factories of certain types within easy walking distance of the large centers of population. It has been found to be true that industries which operate on a seasonal basis and which require large numbers of unskilled workers are severely handicapped if they are located at a considerable distance (in time and cost) from the residence districts. Aside from the mere matters of expenditure for carfare and ease of getting to work, the central zone is attractive to workers because it gives them interesting and exciting things to think about. Manufacturers on the outskirts of the city record instances of losing employes not infrequently because they are bored during their lunch hour. This is not a trivial matter. A factory worker who does uninteresting and monotonous work for eight or nine hours a day craves outside stimulant, and the sights of Manhattan and its crowded streets seem to contribute to the satisfaction of that craving. It is evident that the causes which determine the location of manufacturing plants are sociological as well as economic.

As regards the residence of their employes, food manufacturing plants are divided into two distinct groups. In the first group are those industries which furnish all-year-round employ-

[1] From Census of Manufactures, New York State, 1919. The industries included are canning and preserving fruits and vegetables, slaughtering and meat packing, sugar refining, and the manufacture of bread and other bakery products, confectionery and ice-cream.

[1] The rule of the Jewish Bakers' Union, which had the effect of limiting output in bakeries of the factory type, has probably minimized the advantages of this type of bakery in the production of Kosher products and discouraged their extension.

ment for adult male workers and which can thus plan to build up a permanent working force living in the neighborhood, or at least within easy access to the plant. The labor demand of this group acts as a centrifugal force in plant location. On the edge of the city in Zone II, or in Zone III, workers can find more satisfactory homes at cheaper rents than they can in the heart of the city, and employers find less competition for their workers from seasonal industries and are thus able to build up a more permanent and satisfactory staff of workers than they could gather together in the crowded center of the city. In the second group of industries there are two types which frequently overlap. There are, first, those industries which employ a large number of dependent wage-earners, and second, there are those which have a distinctly seasonal demand for labor. The labor demand of both types acts as a centripetal force bringing the industries affected into the heart of the metropolis where they have ready access to transit facilities which enable them to draw on the residence districts outside the center of the city, and where they are near the crowded and poorer residence sections which send their boys and girls to work as soon as the law permits. A family as a rule makes its home in a district which is convenient for its chief wage-earner, and industries which need the services of other members of the family must be able to draw on a wide territory. Likewise industries which cannot offer workers permanent employment must be so located that they can draw on the labor pool of the metropolis, that large group of men, women, boys, and girls who shift from one job to another during the year, and who are constantly at the call of a newspaper advertisement or of a sign outside the employment office.

There are, of course, in almost every industry tendencies opposed to these labor factors which may be strong enough to determine the location of a plant in a spot where it is difficult to get the desired type of employe. High land values in lower Manhattan have carried some of the industries with a seasonal demand for workers outside the center of the city. And the advantages in distribution to consumers of a location near the center have kept some industries there, when their demand for labor would otherwise have taken them into the outskirts of the city.

The slaughter-houses are a good example of the last-mentioned situation. Their demand for adult male workers varies only slightly from one season to another, and this would naturally call them into the environs, but the advantages of a location on Manhattan for delivery to the Kosher trade are so great that the slaughter-houses situated there have clung tenaciously to their locations on the Hudson and the East Rivers.

In the same way the large bread and cake bakeries which cater to consumers in Manhattan have in most cases remained there, although the cheaper land values on the edge of the city would be attractive both to the factory owner and to his employes, who form a relatively permanent group. The bread and cake bakeries which produce for consumption outside the city, however, have in most cases located outside the population center, where the supply of employes is not so plentiful as in the heart of the city but where the workers available are more satisfactory than the average worker in the Manhattan area.

In an endeavor to procure accurate information in regard to the residence of workers in different parts of New York and its environs, a questionnaire was circulated among the employes of various food manufacturing plants asking place of residence and time consumed in making the trip one way between home and shop. In addition, office records were utilized in the case of two large plants in Manhattan to ascertain the place of residence of their employes.

In connection with the need of seasonal industries for a large labor pool to draw upon at the height of the year's activities, the records of employe residence of a food manufacturing plant located between West Fourteenth and West Twenty-third Streets are particularly interesting. The distribution of the employes of this plant is shown graphically in Diagram VII. At one time during the summer of 1923 this plant employed almost 13,000 persons. Of these, 4,600 lived in Manhattan south of Twenty-third Street, and 1,700 more lived between Twenty-third and Seventy-second Streets west of Broadway. The concentration was about equally great among the men and women workers. There was, however,

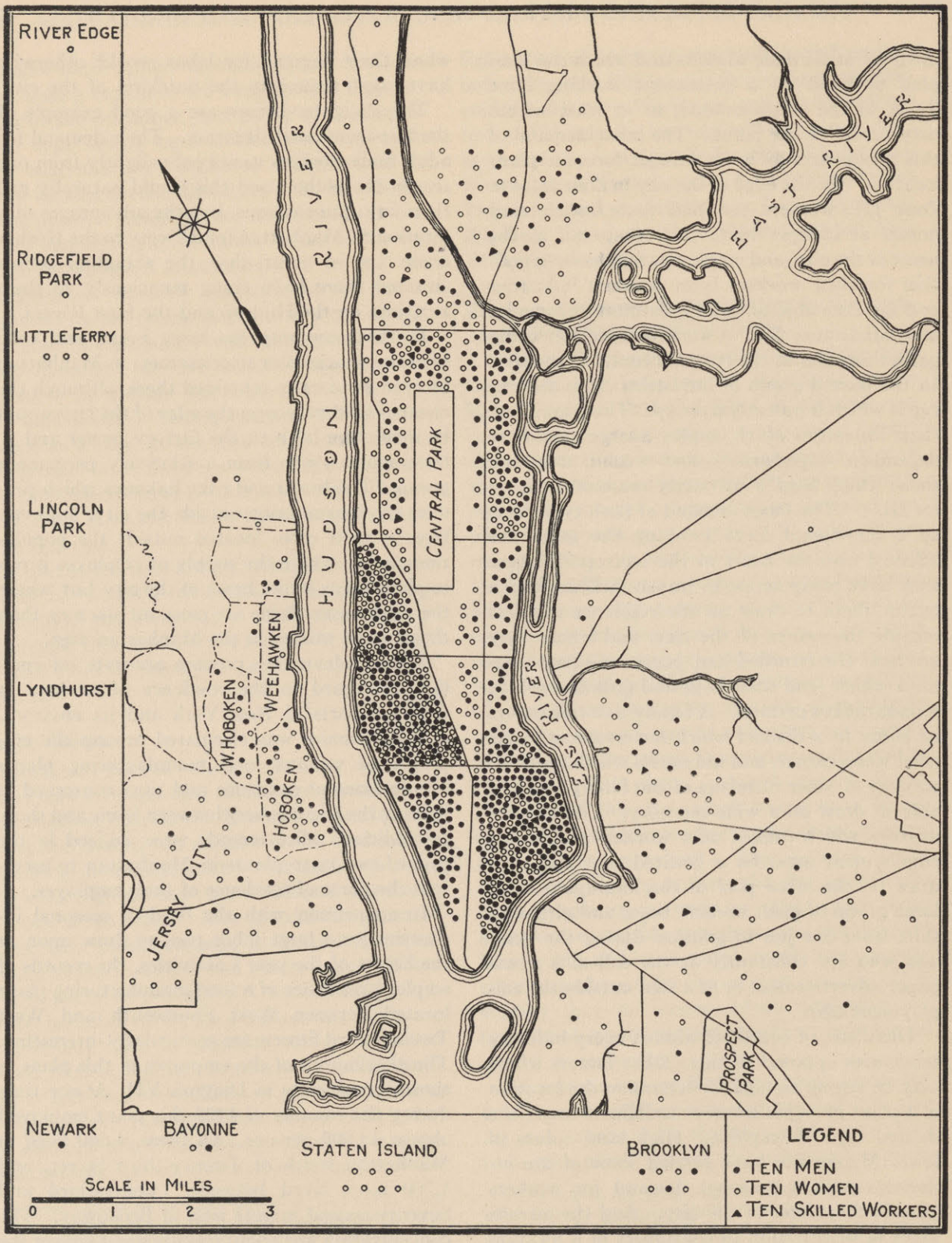

DIAGRAM VII

Residence of employes of a large food manufacturing plant on the West Side, between Fourteenth and Twenty-third Streets, in August, 1923

a striking difference in nationality. Among the total number of women employed (and most of them are girls and young women) 83 per cent were American born. Among the men there was a wider range. Thirty per cent were American born, slightly more than 30 per cent were Italian, and about 40 per cent of other nationalities.

The questionnaire circulated in connection with the study of employe residence was filled out by slightly more than 3,000 persons in nine different food manufacturing establishments. Of these, 1,450 worked in Brooklyn, 750 in Manhattan, and the rest were divided about equally between the Bronx and Queens. The following table shows the method used by the employes in the different parts of the region in getting to their work, and the time consumed by those who use surface cars, subway, elevated, or bus.

TABLE XLII.—METHOD OF AND TIME CONSUMED IN GETTING TO WORK BY EMPLOYES OF SELECTED FOOD PLANTS IN NEW YORK CITY

Location of plants	Per cent walking to work	Per cent riding to work in					
		1–15 minutes	16–30 minutes	31–45 minutes	46–60 minutes	More than 60 minutes	Total
Zone I							
Manhattan South of 59th Street	20	12	40	14	11	3	100
Zone II							
Northern Manhattan	40	10	19	10	8	3	100
Bronx	37	14	27	1	1	..	100
Brooklyn	40	8	26	15	7	4	100
Queens	24	7	33	16	13	7	100
Total	34	10	29	14	9	4	100

It is evident that the wide difference in the percentage of those who walk to their work in Brooklyn, the Bronx, and northern Manhattan and in Queens is partly a matter of housing and partly a matter of transportation. The small percentage of those who walk to work in Zone I (Manhattan South of 59th Street) is to be accounted for by the fact that the figures represent the situation of the employes of one of the slaughter-houses on the East River. The plant employs for the most part unskilled laborers. While the immediate neighborhood of the plant is poor, it is not sufficiently large in extent to supply the necessary number of workers, and the plant is obliged to go to other parts of the region for its labor supply. The figures for Queens would be much more striking if they were limited to the plant in Long Island City. At that plant only 17 per cent of the employes walk to their work, and 40 per cent take more than half an hour to ride from home to factory. The situation in Long Island City is complicated by the fact that factory development has been very rapid there since 1914 and that housing and transportation have lagged behind the industrial growth. The development began in 1909 when the Queensboro bridge was built from Manhattan at 59th Street across the East River to Long Island. Building activities were increased by the completion of the Queensboro subway from the Grand Central station to Long Island City and the Queensboro bridge plaza in 1915 and 1916, and by the extension of the Second Avenue elevated railway over the bridge at 59th Street in 1917. The development of the southern portion of Long Island City has been very much influenced by the building of the Degnon terminal and railway, begun in 1913. The census figures indicate that the number of wage-earners in the borough increased from 24,194 in 1909 to 47,222 in 1919. Unfortunately, the residential development of the district has not been so rapid. The Queensboro Chamber of Commerce estimates that 50 per cent of the workers of Long Island

City live in other boroughs. At the present time extensive industrial housing projects are under way.

The difficulty of getting and retaining workers in Long Island City is increased by the fact that it has no rapid transit connection with Brooklyn. It is quicker and easier, and in many cases cheaper for workers to go from Brooklyn to Manhattan than to go from Brooklyn to Long Island City. This difficulty also seems in a fair way to be remedied. The Board of Estimate has approved a plan for a north and south subway to connect the factory district of Long Island City with the Williamsburg district in Brooklyn and with the three east and west Brooklyn subway lines. If this project is carried to completion a large center of population will be connected with a section which has an increasingly large demand for labor. The Queensboro Chamber of Commerce is urging upon the attention of the Transit Commission the desirability of building an east and west subway throughout the width of Queens to connect Manhattan with Jamaica. It is pointed out that the projected Williamsburg-Long Island City subway will not open up any new residence districts. It will simply connect a district which needs labor with a district which is already well filled. The suggested rapid transit line from Jamaica would, on the other hand, open up a section which is still to be developed, and might make it possible to house the workers of Long Island City in a new section rather than to send them into a region already crowded. This part of the region is also greatly in need of surface cars. Several of the large food manufacturing plants in the borough send buses to meet subway and elevated trains in bad weather, and some of them use buses to meet their employes every day.

Differences in Place of Residence Among Different Nationalities

The returns from the 3,000 questionnaires filled out by employes in the food industries show that there is a greater concentration in the industrial districts among foreign-born workers than among American-born workers. Forty-two per cent of the foreign-born workers live within walking distance of the plants where they work, as compared with 25 per cent of the American born. Among the foreign born, the West Indian workers are a conspicuous exception. They are presumably all or almost all Negroes, and only 17 per cent live near enough to the factories to walk to their work.[1] The group showing the greatest concentration includes those born in Poland, of whom 70 per cent walk to work. Next come the Russians with 40 per cent, then the Italians with 39 per cent, the Irish with 37 per cent, and the Germans with 32 per cent. The other nationalities are scattered and not sufficiently homogeneous to rank.

Value of the Land Occupied by Food Plants

It has not been possible to prepare statistics on the value of the land[2] occupied by all the food manufacturing establishments in the entire region, but such material has been assembled for the large plants (20 or more employes) on Manhattan in 1917 and for plants of all sizes on Manhattan in 1922.

In recent years land values have increased most conspicuously on the edge of the financial district, in the blocks near the waterfront on both sides of the Island, in the Thirty-fourth and Forty-second Street districts, in the region from Fifty-ninth to Seventy-ninth Street between Central Park and Broadway, in several isolated districts on Morningside Heights and on Lexington Avenue from Sixty-second to Eighty-ninth Streets. Land values have declined in the Madison Square district, on Twenty-third Street and on Broadway as far south as Union Square.

In general, food manufacturing plants cannot afford to pay as high rents or to occupy as valuable land as some of the other manufacturing industries on Manhattan Island (as the clothing industry, for instance). Since 1917 there has been a distinct movement out of this center of the region to cheaper land in Long Island or New Jersey, or from more expensive to less expensive land in Manhattan. In 1917, for instance,

[1] There were 170 West Indian workers in the 3,000 from the food manufacturing plants replying to the questionnaires. Most of them work in the sugar refineries and the slaughter-houses.

[2] The 1917 factory inspection cards were compared with a land value map prepared from the assessment records of 1914, and the 1922 cards were compared with a map based on 1923 assessment data.

TABLE XLIII.—VALUE OF LAND OCCUPIED BY FOOD MANUFACTURING PLANTS ON MANHATTAN ISLAND IN 1917 AND 1922—PERCENTAGE DISTRIBUTION

Branch of industry	1917—Plants with 20 or more employes					
	Value in dollars per front foot					
	101–200	201–500	501–1,000	1,001–5,000	Over 5,000	Total
Baked goods	7	48	34	7	4	100
Confectionery	..	30	36	30	4	100
Meat and dairy products	..	59	29	12	..	100
Coffee, tea, cocoa and spices	..	13	62	25	..	100
Other food products	1	31	42	25	1	100
Per cent of total	2	35	40	21	2	100
	1922—Plants with 20 or more employes					
Baked goods	2	49	39	10	..	100
Confectionery	6	31	45	18	..	100
Meat and dairy products	..	68	24	8	..	100
Cocoa, coffee, tea and spices	..	14	36	50	..	100
Other food products	7	52	31	7	3	100
Per cent of total	4	47	34	14	1	100
	1922—Plants with less than 20 employes					
All branches (per cent)	2	28	51	18	1	100

there were four food manufacturing establishments (20 or more employes) located in parts of the city where land is valued at more than $5,000 a front foot.[1] In 1922 there was only one. In 1917 there were 44 which occupied sites in districts where land was valued at from $1,000 to $5,000 a front foot, and in 1922 there were only 25. Of the large plants (20 or more employes) 63 per cent occupied sites worth more than $500 per front foot in 1917. In 1922 this percentage had dropped to 49.

A few of the smaller food manufacturing establishments continue to occupy some extremely valuable land. There are the coffee-roasting establishments which still remain in the streets near the financial district where land is valued at from $1,000 to $5,000 a front foot for a lot 100 feet deep. It seems probable, however, that these roasters will in the course of time follow the example of several other firms which have moved out of this district since 1917.

The other food manufacturing establishments occupying high rent land in the $1,000 to $5,000 group are plants of a service nature which gain greatly from a location which enables them to manufacture and to sell to a large clientèle in the same building. They are for the most part plants making baked goods, candy, ice-cream, and artificial ice.

There are, however, a relatively large number of food manufacturing plants able to command the use of land in the next value group, that is, land worth $500 to $1,000 a front foot. These plants profit especially by a central location because of its advantages either in procuring employes or in delivery to consumers. Some of the largest food producing concerns in the New York region are included in this group, and a large number of the plants with 250 to 499 employes.

[1] For a lot 100 feet deep.

The industries conspicuous in the group are bakery and confectionery manufacture and slaughtering and meat packing. Many plants of these three types are also to be found on land valued at from $200 to $500 a front foot, and a few small plants (that is, plants with less than 20 employes) on land valued as low as $100 a front foot.

In considering these land value figures it should be remembered that the small food manufacturing plants are frequently located in cellars, and that when small plants are found in districts where land is valued as high as $1,000, or even $500 a front foot, it will, as a rule, mean that food products are being manufactured in the cellar for sale in a retail store on the surface. Even in the case of plants with as many as 20 workers an expensive location will mean that at least some of the employes work below the street level.

PROBABLE FUTURE OF THE FOOD INDUSTRIES IN NEW YORK AND ITS ENVIRONS

In the foregoing survey of the different food industries it is possible to discern various general forces at work affecting the distribution of the plants. The reasons which lie back of the existing distribution of food plants and which will affect the future distribution are for the most part fundamental in character and of general significance. New York, practically barren as a source of original supply for food products, finds its great advantage in its convenience as an assembly and distribution point.[1] Transportation, particularly the harbor, is the foundation of its prosperity.

Where bulk and perishability are greatly reduced by processing the raw materials at the point of extraction, a certain amount of fabrication almost inevitably tends to locate there. But once these elements are eliminated the processes apparently tend to move forward toward the markets. Thus sugar cane is reduced to raw sugar near the fields, after which there is practically no reduction in bulk and little loss through spoilage.[2] The remaining processes may be economically performed near the areas of consumption. Convenient points for assembling the raw materials which are also convenient for distributing the product in its final form become attractive sites for plants.

On the other hand, certain products are bulky and perishable in their final form as compared with the raw materials from which they are made. Bread and ice-cream are good examples. These factors operate to tie the processes very closely to the consuming area, and plants performing these processes tend to become practically a function of population.

So far as the factors mentioned in the preceding paragraph operate in the situation, it is inevitable that there should be a decline in the relative importance of New York as a food center if New York itself becomes relatively less important as a population center. Moreover, with the development of the country, or with changes in the relative cost of water and land transportation, new points convenient for assembly and distribution arise.[1]

Other elements are, of course, operating. The labor supply available in a district such as this is an important factor in determining the distribution of plants, particularly where the industry is seasonal, as in the case of biscuit and cracker baking and candy making. Again, religious customs exert an interesting influence on the distribution of slaughtering.

Sugar Refining

The most important food industry in the New York region which depends on an imported raw material is sugar refining. Waterfront location with railroad connections, large floor space for its extensive equipment, and abundant supply of unskilled male labor during the busy season of the year have already been mentioned as the outstanding needs of this industry.[2] It is certain that when new sugar refineries are located in the region they will be placed on the waterfront in Zone II, or perhaps in Zone III. It seems clear, further, that additional refineries will be located about New York harbor, whenever local consumption of refined cane sugar has increased beyond capacity of present plants. By "local" is meant the areas to which it is economical to ship sugar from the port of New York.

[1] Incoming ships can be more sure of a cargo for the outward voyage in the port of New York than in other ports.

[2] Coffee beans, tea, spices, and cocoa beans furnish further examples in the field of food products.

[1] It is to be expected, therefore, that there would be variations in the relative importance of New York as a port. The following figures are of interest in this connection:

PERCENTAGE OF NEW YORK CUSTOMS DISTRICT TO ALL UNITED STATES PORTS

	Imports	Exports
1860	64.5	34.5
1870	63.6	43.5
1880	68.9	47.0
1890	65.4	40.7
1900	63.2	37.2
1910	60.1	37.4
1920	54.8	39.9

[2] See page 16.

The problem of the future expansion of cane-sugar refining in New York harbor is complicated, however, by the question of tariff policy. If the United States continues its present tariff policy in regard to raw cane sugar, the competition of domestic beet sugar will become increasingly important. Beet-sugar production in the United States has increased greatly in recent years. Its future depends in great measure on political factors.[1]

In considering the importance of the political factor in the future of the two branches of the sugar industries it should, however, be recognized that recent improvements in the beet-sugar industry in the United States have increased its competing power. It was estimated by an expert of the Tariff Commission in 1919 that 82 per cent of the beet-sugar factories in the United States could survive if the tariff on raw cane sugar were entirely removed.

If beet-sugar production continues to increase it will tend to retard the growth of cane-sugar refining about New York harbor. The processes of producing and refining beet sugar are commonly carried on in one factory, and there seems to be no reason to suppose that this procedure will be changed. On the other hand, it seems probable that beet sugar will soon be produced in Zone III of the region under discussion in this study. A company has been organized for the production of beet sugar on Long Island; plans are under way to increase the beet-sugar acreage on the island and to erect a beet-sugar factory there. It is impossible to say at the present time how extensive this undertaking will be, or what effect it will have on the cane-sugar refining industry of the region.[1]

It is evident from this brief survey that it is almost impossible to predict the future of cane-sugar refining in the New York region, or the relative position of this port and other ports on the Atlantic seaboard which now refine or which may refine cane sugar. The prophet who predicts their decline in the face of the competition of beet sugar may be confounded by the elasticity of the demand. The per capita consumption of sugar invariably increases when sugar prices fall. If the cost of sugar production can be materially reduced, the limit to average consumption is yet far off.

Coffee and Spice Roasting and Tea Packing

The tendency toward decentralization in the coffee and spice roasting industry and in the packing of tea has already been commented upon.[2] The day has gone by in the United States when these commodities (which are essentially luxuries) were unfamiliar in the average home. Their use has become so widespread that it is now economical for wholesale grocers throughout the country to prepare their own brands of tea, coffee, and spices. The result is that the relative importance of New York in the preparation of these commodities has declined in the past few years and it probably will continue to decline. In terms of pounds of tea, coffee, and spices handled, however, there is little reason to expect a decline. The population prophesied for this region in the coming years will, unless American habits change greatly, consume large

[1] In considering the question, the following paragraph is significant:

"One who has studied the development of the sugar industry in the various countries of the world cannot help being impressed with the rapidity of this development in the last century; nor can one fail to note the important part which legislation has had in shaping this growth. While it is true that agricultural and industrial factors have been of fundamental importance in every case, yet favorable conditions of these kinds have been so widespread, comparatively, that political considerations and legislation have been the factors which have determined largely the direction and rapidity of this development in nearly every important sugar-producing country. As regards the industry of any particular nation, not only the policies of the home government, but also those of foreign nations are often of vital importance. Striking examples of these facts have been shown in the remarkable rise and great vicissitudes of the European beet-sugar industry, and also in the recent extraordinary revival of the tropical cane-sugar industry. The same has been shown to be emphatically true of the growth of the domestic beet by following certain political policies and adopting certain forms of legislation, either develop the home beet-sugar industry so as to supply our entire consumption, or on the other hand bring it about that our entire needs will be supplied through importations."—Blakey, Roy G., in The Beet Sugar Industry, p. 253. This paragraph was written in 1912, but in a letter to the writer the author reaffirms his opinion of twelve years ago.

[1] Sugar beets were first grown on Long Island in 1912 by the Long Island Railroad Agricultural Department at its experimental farm at Medford. Since that time a number of farms have undertaken their cultivation. The Director of Agriculture for the Long Island Railroad has meanwhile been engaged in the work of improving the average sugar content of the beets grown on the Island. (New York *Times*, August, 1923.)

[2] See page 38.

amounts of all three, and production to meet the demand of the region and the states bordering on it must be greater than it is at present.

As to their location within the region there seems to be no question about their tendency to move into or to locate in Zone II (Twenty-mile Industrial Zone) rather than in the very center of the area. Labor supply is not of primary importance in any one of these three industries. Transportation and warehousing are much more vital. Increasing rents in Manhattan have made a situation in some other district seem desirable. Coffee, tea, and spice warehouses are naturally located on or near the waterfront, and it is of advantage to the manufacturer to be near his supplies of raw material. At the present time the Green Coffee Association has an agreement with the New York Dock Company, the Bush Terminal, and the Jay Street Terminal (owned and operated by Arbuckle Brothers for the warehousing of green coffee). If these agreements continue, they will furnish a powerful reason for the coffee roasters to locate in the Long Island section of Zone II, either in Brooklyn or Long Island City. If the warehousing should be moved to New Jersey there would undoubtedly be a movement of roasters in that direction.

The Preparation of Chocolate and Cocoa

The manufacture of chocolate and cocoa products is not primarily a metropolitan industry. Machinery predominates in their manufacture, and it is almost always carried on on a large scale and seasonal fluctuations are relatively unimportant. This industry has remained in the New York region, first, because its chief raw materials, cocoa beans and refined sugar, are readily available here, and second, because of the large market in the region both for the chocolate products for immediate consumption and for the chocolate liquor and coatings which are used by confectioners.

The labor demand in this industry is of the type which has been called "centrifugal." The industry furnishes relatively steady employment to adult male workers, and this fact combined with the advantages of cheaper land in Zones II and III will undoubtedly draw plants which specialize in chocolate and cocoa production into these districts. There seems to be every reason to believe that the New York region will continue to produce for its own consumption and for that of neighboring states all the commonly used chocolate and cocoa products (except milk chocolate, which is predominantly manufactured in the dairying sections of the country), and that its manufacture within this region will develop as the population of the region and of the neighboring regions grows.

Biscuit and Cracker Manufacture

Biscuit and cracker baking furnish a striking example of the distinctly metropolitan industry. It employs large numbers of dependent unskilled workers and needs more workers at some times of the year than at others. On this account a factory making biscuits and crackers requires a location near transit lines which will connect it with residence districts, and a residence district near at hand is of great advantage to it. It seems clear, therefore, that when new cracker factories come to the New York region they will be located in Zone I or very near it so long as the present radial system of transportation persists.

It is doubtful, however, if a new baking enterprise of this sort of any considerable size will be located here for some time to come. The very large output in Greater New York at the present time supplies the entire region under consideration in this study, the rest of Connecticut, New Jersey, New York State, and states farther south. Indeed, it is quite possible that when population growth has resulted in a demand great enough to warrant the building of another large plant, that the new factory will not be built in the New York region.[1] Some other city with a large population, a large supply of sugar, and rail connections with the flour producing centers of the country will probably be chosen, until population growth in the New York region warrants another such factory here.

Bread, Cake, and Pie Baking

The situation of the bread, cake, and pie bakeries in New York and its environs is very different from that of the biscuit and cracker

[1] The National Biscuit Company opened a large new plant in Philadelphia on May 1, 1924.

factories. In the first place, the greater part of their product at the present time is consumed within the New York region. In the second place, their need for labor is only very slightly seasonal. In general their output is the same the year round. This latter fact, combined with the advantages of a location in the residence sections in distributing to consumers, keeps bakeries of this type out of the strictly manufacturing districts. The trend of the industry seems to be in the direction of medium-sized bakeries, with 50 to 150 employes, scattered throughout the residence districts. Such establishments can claim all the advantages of modern equipment and at the same time economize in delivery to consumers. In fact the economies of a plant of this size are so great in bread baking (if operations are confined to one or two standard types) that a factory of this type can economically supply its own immediate neighborhood and can ship by truck to outlying regions. A bakery in the Bronx, for instance, with slightly more than 100 employes, now supplies bread to retail grocers in its own area and ships by trucks as far north as Ossining and as far east as Westport, Connecticut. As population increases there will doubtless be a growth of bakeries of this type in the outer edge of Zone II and out into Zone III, but the growth will certainly be with population and not ahead of it, if present tendencies hold good.

The problem of the location of bakeries in Manhattan is more complicated. The present State Labor Law allows bakeries to remain in the cheapest location in the city, that is, in the cellars of tenement houses, *if a bakery was located there in 1912 or was in process of construction in January, 1913.* The result of this exemption has already been pointed out. There are 3,077 bakeries located in cellars in New York City at the present time, and 1,368 in Manhattan alone.[1]

If a new state law were passed, or a more drastic ruling made by the Municipal Board of Health (which would be quite possible under the present law), which would have for its intent hastening the abolition of cellar bakeries, what would be the effect on the baking industry in the New York region? Judging from present trends, two types of bakeries would increase as the result of such a measure. First, it would stimulate baking of bread in bakeries with from 50 to 100 employes and with extensive mechanical equipment; and second, it would materially increase the number of smaller bakeries specializing in cakes, pie, pastry, and fancy breads, bakeries with, say, from 20 to 50 employes, some of them highly skilled in the arts of baking. The last named products cannot be manufactured on a very large scale as well as bread, as they are not so easily standardized. Different neighborhoods have different tastes, and although a large market has been developed for standardized loaf cakes and biscuits and crackers, it seems likely, and indeed it is to be hoped, that there will always be a place for the skilled baker who is an individualist.

It is not to be supposed, however, that doing away with cellar bakeries would eliminate the very small bakery, the establishment with one or two or five employes. Now that gas ovens are available and it is no longer necessary to construct a floor strong enough to support weight of a brick oven in order to have a surface bakery, the expense of producing baked goods above ground has been greatly reduced; and these very small-scale bakeries would doubtless continue here, as they have in other places when cellar bakeries were eliminated.[1]

Confectionery Manufacture

There are three different trends to be observed in confectionery manufacture, and they are

[1] Cellar is used here as distinguished from basement. In accordance with the Tenement House Law, which defines a cellar as a room or part of a building which has more than one-half its height below the level of the curb or the ground adjoining the building, excluding areaways. A basement is a room in or a part of the lower story of a building which has more than half its height above the level of the curb. There are very few bakeries in basements in New York City, because basement rents are much higher than cellar rents and there are plenty of cellars available.

[1] The English law in regard to bakeries requires that a place underground (defined as a bakehouse in which the floor surface is more than three feet below the footway of the adjoining street or at the ground adjoining or nearest to the room) may not be used as a bakehouse unless it was so used before 1901, and not then unless it is certified by the district council to be suitable as regards construction, light, ventilation, and in all other respects. It is said that the operation of this law has practically done away with cellar bakeries throughout England. The Chicago Board of Health regulation in regard to bakeries forbids the establishment of a new bakery in a room where the floor is more than five feet below the street level, and if it is more than three feet below the street level the window ventilating must be more than three feet *above* the street level. The ordinance further provides that if a bakery is vacated, dis-

determined in each case by the nature of the product and the nature of the market. There are first the small shops manufacturing ice-cream and candy for consumption in the immediate neighborhood. They have increased in number in recent years but their proportion of output has declined greatly. They are gradually giving way to plants of larger size which specialize in either one product or the other. Then there are confectionery factories which use a great deal of machinery. They are seeking Zone II of the New York region, but are retarded by the irregularity of their demand for labor. As the labor factor is not of overwhelming importance in candy production by machinery, such factories have frequently found Zone II a satisfactory location. This applies to large-scale ice-cream manufacture as well as to candy. The third group includes the large and medium-sized factories which manufacture chocolate bonbons and require a great deal of relatively unskilled labor at different seasons of the year. These plants are very largely kept within Zone I because of the difficulty of attracting such workers in the second and third zones of the region.

At the present time there is manufactured in New York and its environs a certain amount of candy which goes outside the boundaries of the region. There seems to be no reason to think that this will not continue to be the case. As population increases in the New York region candy consumption will increase here, but there is an economy in the large-scale production of certain types of candy which will encourage its manufacture here for a country-wide market.

Slaughtering and Meat Packing

The problem of the future location of the slaughter-houses within the New York region is complicated by such questions as the continuance of Kosher customs, transportation from the Middle West, transportation within the region, and the most economical size of this industry.

The first three questions are closely connected. There seems to be no doubt but that strict adherence to Kosher requirements is on the wane among American Jews. There is an important section of the Jewish congregation which regards the Kosher ceremony as a symbol which has lost much of its ancient significance, while there are many Jews who have broken entirely with religious customs. Unless there is continuous immigration to this region from centers of orthodox Judaism in Europe the demand for Kosher food will probably be insignificant fifty years from now. Such a result would mean a great falling off in the demand for beef from animals killed within a few hours. When this demand declines, in all probability a larger proportion of the beef consumed here will be supplied from the Middle West and shipped here in refrigerator cars.[1]

It is much cheaper to slaughter meat animals in the regions where they are grown and to ship the carcasses or "cuts" to the New York region than to send the live animals. It does not seem likely, however, that this would apply in the case of veal, and the slaughter of hogs, sheep, and lambs would not be affected, as the Kosher trade uses no hogs or sheep and very little lamb. There seems to be no reason to expect a movement of this branch of the industry outside the region.

The movement within the region is also bound up with the Kosher trade. The demand for meat from animals killed within twenty-four hours makes a central location a necessity for a large abattoir distributing over a wide area. Most of the Jewish retailers come to the slaughter-houses in the afternoon to inspect animals slaughtered in the morning, and they expect delivery early the next morning. If this trade is to be supplied by large-scale producers, the present location of the slaughter-houses in Manhattan seems inevitable until there is a substantial improvement in transportation facilities between Man-

continued, or unused for a period of more than six months and shall thereafter be reopened or re-established as a bakery, such bakery shall be considered a new bakery for the purposes of the ordinance. The laws in regard to the manufacture of food for the states of Ohio, Oklahoma, Rhode Island, Washington, and Wisconsin have similar provisions in regard to the reopening of cellar bakeries after their being vacated by the tenants in possession at the time the laws were passed, and in some instances they are even more stringent than the Chicago ordinance. Such a provision would greatly strengthen the New York law. As it now stands a cellar bakery built before 1912 may remain in operation until the building in which it is situated is torn down, even though it does not conform to the space regulations of the 1912 law.

[1] At the present time beef (not including veal) supplies half the total amount of meat consumed in the region, and more than half the beef consumed here comes from animals slaughtered within the region.

hattan and New Jersey, and Manhattan and Brooklyn and Queens. Since in spite of all the improvement which has been made in slaughter-house technique in the last generation, it is not possible to keep the districts round about them entirely free from odors,[1] it would be a decided advantage to have them located less near the center of the area.

The problem of the movement of the slaughter-houses within the districts is further complicated by the question of the most economical size of plant. The opinion is often expressed within the industry at the present time that the medium-sized slaughter-house can be operated more cheaply than establishments of very large size. If this is true it will naturally result in course of time in an increase in the number of medium-sized abattoirs as population growth necessitates slaughtering of more calves, sheep, lambs, and hogs within the region. The relative position of the plants on Manhattan below 59th Street has declined since 1900, and slaughtering in Zone II has increased. Slaughtering in Zone III has increased since 1900 but has declined since 1912.[2]

At the time of the packing house strike in New York in December, 1921, the Meat Cutters Union petitioned Mayor Hylan and the Board of Estimate to investigate the situation of the small slaughter-houses in the city and their difficulties in getting space for their operations, with the idea of establishing a municipal stock-yard and slaughter-house for this area. It was suggested such an institution would be of great benefit to the small slaughter-houses of the region and that by simplifying marketing it would encourage the production of meat animals (particularly sheep and lambs) in districts nearer New York than the present source of supply. Such abattoirs have for many years been successfully operated in the large cities of Europe, and there are a few in operation in the United States. The construction of municipal abattoirs has long been favored by the United States Department of Agriculture, which published in 1912 a description of municipal slaughter-houses in Europe.[1]

The New York office of the Labor Bureau, Inc., made a study of the sites available for slaughter-house purposes in this area and suggested either the Newtown Creek region, which is at present a factory district and which will in all probability continue to be devoted to manufacturing enterprises, or the flat land in and around the Astoria Gas Company's plant which projects into the East River at Hell Gate. It would be possible to transport cattle by water to both these locations, and neither is too far from large centers of population to make delivery impossible. The Bureau in suggesting these sites said that there were doubtless others available, but that these two were mentioned simply to show that there were possible sites outside the city. Both suggestions seem practical and to improve on the present locations in Manhattan and Brooklyn.

The Region in General

In concluding this study and reviewing the trends of the different industries which it includes, it seems possible to defend the position that there are only two groups of plants which are likely to remain in Manhattan below 59th Street indefinitely. First, there are those which require a large and fluctuating number of dependent wage-earners; and, second, those which gain a particular advantage in distribution by remaining there. The first group includes cracker, biscuit, and candy plants; the second bread and cake bakeries (and possibly slaughter-houses), ice-cream plants, and other food industries catering to the inhabitants of the district below 59th Street. Zone II will retain the food industries which can command waterfront space, and industries like coffee and spice roasting, tea packing, where easy access to the waterfront is an advantage, and the service industries, like slaughtering and meat packing, bread, cake and pie baking, which will move into the environs as population moves, and candy making, except where the labor factor is of importance.

[1] It has already been noted in this study that the Manhattan abattoirs are at the present time at the request of the Board of Health installing new machinery for blood disposal, and it is expected that the new equipment will materially relieve the residence, theater, and shopping districts which are sometimes annoyed by slaughter-house odors.

[2] See page 24.

[1] Municipal Markets and Slaughter Houses in Europe. Special Consular Reports, Vol. XLII, Part III. Government Printing Office, 1910.

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