MARKETING GEOGRAPHY OF OPEN DISPLAY COLD STORAGE EQUIPMENT

BY

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THESIS

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CHAPTER I

Nature and Scope

The object of this thesis is to develop the significant geographic variables in the sales problems of open display cold storage equipment, to analyze these variables through the tools of geography, and to describe, classify, and interpret them in the light of marketing techniques for this product. To do this, known marketing factors will be studied from a geographic point of view. A further object of this thesis is to develop marketing geography techniques, a subject which has had very little study.

Before going further, something should be said about the nature of marketing geography. Marketing geography is no different than the field of geography itself, applied to a particular problem. Geography is the analysis of the significance or meaning of differences and similarities which exist from place to place on the surface of the earth. Markets are existing or potential consumers of goods and services. Consumers are people, business establishments, and institutions existing in a social and physical environment. Marketing geography applies geographic concepts to a study of markets and channels of distribution. The primary problem is concerned with these markets in terms of location, magnitude, potential, and sales characteristics. The materials that marketing geography works with are statistics and maps derived from statistics. The method of study is to determine marketing factors, compile the necessary statistics, construct maps, and to describe and interpret these maps. The results of marketing geography may be the evaluation of existing markets, the discovery of new markets, determining market potential, setting sales quotas, or delineating trading areas.

This thesis, however, will not be concerned with the entire scope of marketing geography. It will only be concerned with the location and magnitude

of markets for a particular product. The objects of this thesis in terms of marketing geography are to evaluate existing markets, to discover new markets, and to determine market potential. The market for open display cold storage equipment is created by people buying foods merchandised in open display equipment. The customer of open display equipment is the grocery store and the company whose products are merchandised by this equipment. These things will be analysed by the tools of marketing geography.

"Open display cold storage equipment" is a general term referring to refrigerated merchandising cabinets which are completely open at the top during the time when the customer comes in contact with them. Such equipment first came into widespread use only after the war and the market is by no means saturated. At present, food products are virtually the only items marketed in open display refrigerated merchandising cabinets. There are two main types of open display cabinets, those maintaining freezing temperatures, known as standard temperature cabinets, and those maintaining zero temperatures, known as low temperature cabinets. They are generally manufactured and marketed together. Milk and dairy products are displayed in the standard temperature cabinets, and other items such as soft drinks and eggs may also be displayed in these cabinets. Ice cream, ice cream products, and frozen fruits and vegetables are the main items displayed in low temperature cabinets. However, interest is growing in the display of meat and pre-cooked and prepared foods in low temperature cabinets.

Sales of open display cold storage equipment are almost entirely to establishments having no such equipment. These sales are either as a replacement for some other type of refrigeration equipment or as an entirely new operation to the establishment. Thus, the products being displayed by these cabinets were in the past merchandised by other types of equipment (ice cream and milk), or are new refrigerated items (frozen foods in general). The merchandising of these products

in open display equipment is in harmony with the trend in food stores toward self-service which has become widespread in this country since the depression.

The first part of this thesis will be to analyze the users of open display cold storage equipment. The products which are displayed by these cabinets are primarily sold through grocery stores. Any of them may be sold in specialty stores or as sidelines in stores whose main sales are not food. A small number of open display merchandising cabinets are used in the latter types of stores, but the important customer is the grocery store. Open display merchandising cabinets not only facilitate self-service, but also take advantage of customer impulse. Most of the items displayed fall into the "impulse" category, inasmuch as the customer usually did not plan to purchase them, and makes the decision, after seeing them, through impulse. This means greater sales both for the storekeeper and for the maker of the individual products. For this reason, not only do retail grocery stores buy open display merchandising cabinets, but also the manufacturer of the products displayed buys them and places them in grocery stores to merchandise the products.

The second part of this thesis will be to analyze the products merchandised by open display refrigerated merchandising cabinets. These products can be grouped into three categories in terms of manufacture, and each will be the subject of particular study. These three categories are: ice cream products, dairy products, and frozen foods. We have seen from the previous paragraph that the makers of these products are customers for open display cold storage equipment, so the sales and the nature of sales of each type of product will influence both the grocery store proprietor and the individual product manufacturer in his buying habits of open display cold storage equipment.

The third part of this thesis will be to analyze the market and the potential market for open display refrigerated merchandising cabinets. The proced-

ing parts of the study will be brought together to form a composite picture of the total potential market.

Finally a specific case will be given as a case study to demonstrate the relation of marketing geography to the actual producer. Numerous companies manufacture open display cabinets, including several larger companies which manufacture many other things. This thesis is being done with the cooperation of one company whose main business is the manufacture of open display cabinets; the R. H. Bishop Company of Champaign, Illinois. The market of this company will be compared to the results obtained in the foregoing parts of this study.

In preparing this thesis , it was necessary first to study marketing geography techniques, and then the marketing of the product in question. After the problem became clarified, the necessary statistics were assembled. The statistical data used were obtained from the R. H. Bishop Company, from government and private publications, and from surveys made by the author by mail. It was found that much data that would be relevent to this thesis does not exist and would require much more time to assemble than the time available would allow.

CHAPTER II

The User of Open Display Cold Storage Equipment

The main user of open display cold storage equipment is the grocery store. Although other stores, such as specialty food stores, and drug stores use this equipment, only grocery stores will be considered in this thesis. The actual purchase of a cabinet may not be done by the individual grocery store itself. A large number of grocery stores are part of a chain[1] and consequently, the chain headquarters make the purchase. In addition, some companies whose products are displayed may also purchase cabinets or may help a store finance the purchase. These intermediate purchasers do not, however, change the pattern of ultimate users whose distribution is the market of concern. Consequently, the distributional variables of the grocery store as the user of open display cold storage equipment will be taken up first, followed by a consideration of the intermediate purchasers.

The Grocery Store

A number of maps of the U. S. can be presented which will show geographically the relative strength and weakness of the grocery store in terms of its potential use of open display cold storage equipment. These maps will be given in two groups, the first giving the general picture of market and population, and the second giving the specific picture of the grocery store.

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1. According to Food Topics, a publication originating in New York City, there were 637 grocery chain headquarters and 538 voluntary and co-operative group headquarters in 1949 in the United States. This is in contrast to their total of 65,249 independent grocery stores at the same time. The actual percentage of grocery stores themselves which belong to chain organizations was not available. An estimate would be about 20%.

There will be four maps in the first group. The first and second are standard prepared maps, one of population distribution in 1930, and the other of retail sales by counties in 1939. The purpose of these two maps is to show detail which it is not possible to show in maps drawn from more specific statistics such as those in the second group of maps in this chapter. The map of population is basic, since other data will be related to population. Some of the statistics could be related to area and this would show actual distribution. However, a change in population generally results in a corresponding change in market characteristics, and some data given in terms of population cannot be converted accurately. Where population is dense, more grocery stores and more sales can be expected. The distribution of retail sales should be similar to the distribution of grocery stores, since grocery stores are ubiquitous retail establishments. The third and fourth maps show population change, one between 1930 and 1950, and the other between 1940 and 1950. These maps have two uses. The first use is to be compared to other maps to bring them up to date if principles of population and market relation can be established; the second is to show areas of expanding market. Open display refrigerated merchandising cabinets have come into widespread use only since the war. Therefore, most of the population change shown on these maps occurred before open display equipment became available. A large number of other types of refrigeration equipment will be new in areas of large population increase. This means that the market for open display equipment as a replacement for worn out equipment of other types will be poor in these areas. Areas of large population increase in the near past show both factors of strength and of weakness as a potential market for open display equipment. Future population increases will mean an expanding market only and strength for open display equipment.

There will be three maps in the second group. The purpose of these maps is to show the position of the grocery store as the potential user of open display

cold storage equipment. The first map is of the number of grocery stores per 10,000 people, by states in 1939. This relates the distribution of stores to population. The fewer people per store, the better the position for sales in terms of population. Also, from this map predictions can be made when change of population is known. The second map is of total sales of refrigerated commodities per store. This map is a measure of the ability of a store to buy an open display cabinet. If sales of refrigerated foods are low, the store will be a poor market for refrigeration equipment. The third map is related to the second one. It shows what percentage of refrigerated commodities sales are compared to the total sales of the store. Where the percentage is low, the interest in refrigeration equipment will be low.

The source of the base data in all these maps is the Bureau of the Census. The standard prepared maps were printed by the government. The change in population maps and all other data related to population in this paper are based on official Census figures of population for 1930 and 1940, and from population estimates for 1950. The statistics on number of grocery stores and sales of refrigerated commodities by grocery stores are based on the Census of Business in 1939.[2] These statistics apply to grocery stores with annual sales over $20,000. Anything smaller than this would certainly not be a potential customer of open display cold storage equipment. The sales of these stores are broken down into several categories, one of which is "milk, eggs, dairy products and ice cream." These are the refrigerated products sold in grocery stores and are the products which could be merchandized by open display equipment. Frozen foods were not, at that time, a large market factor. The statistics are given by states and the coverage averages three-fourths of all stores and varies from one-half in some

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2. Retail Trade, Commodity Sales, Grocery and Combination Stores, U. S. Government Printing Office, Washington, D. C., 1941.

states to nine-tenths in others. Percentage coverage was multiplied times the total number of stores to give the approximate total coverage. This was done to make the different state figures comparable. Data such as stores related to population and sales per store were then calculated from these figures.

The first map to be presented is that of population distribution in 1930 (Fig. 1). It shows that people are very unevenly distributed in the United States. Large concentrations are shown in the "Industrial Belt," that is, from Massachusetts and Maryland to Illinois and southeast Wisconsin. Within this belt, population is concentrated in certain areas. The heaviest concentration is found along the East Coast. Other concentrations are found in western New York and Pennsylvania, northeast Ohio, southeast Michigan, southwest Ohio, central Indiana, northeast Illinois and southwest Illinois and adjacent Missouri. There are several additional alligments of population concentrations somewhat smaller than those already described. One extends from southeast Virginia to northern Alabama. Another extends from West Virginia to Alabama. A third is found from western Iowa to southern Texas. A fourth lies along the West Coast from western Washington to southern California. Practically all the other states have one or two small concentrations of population. Behind this is a general matrix of population, rather uniform in the eastern half of the country, and spotty in the western half.

The second map shows retail sales, by counties, in 1939, (Fig. 2). The same general pattern is shown as on the population map. Dense areas are denser and light areas are lighter. This means that there is a heavy alligment of sales across the map from Massachusetts and Maryland to Illinois. A second dense area is found in California. Within these dense areas, sales are concentrated in cities. Outside of the densest areas are two alligments of counties with large retail sales. One of these alligments extends from Minnesota to Texas and the other extends from Virginia to Alabama. Other counties with important retail sales

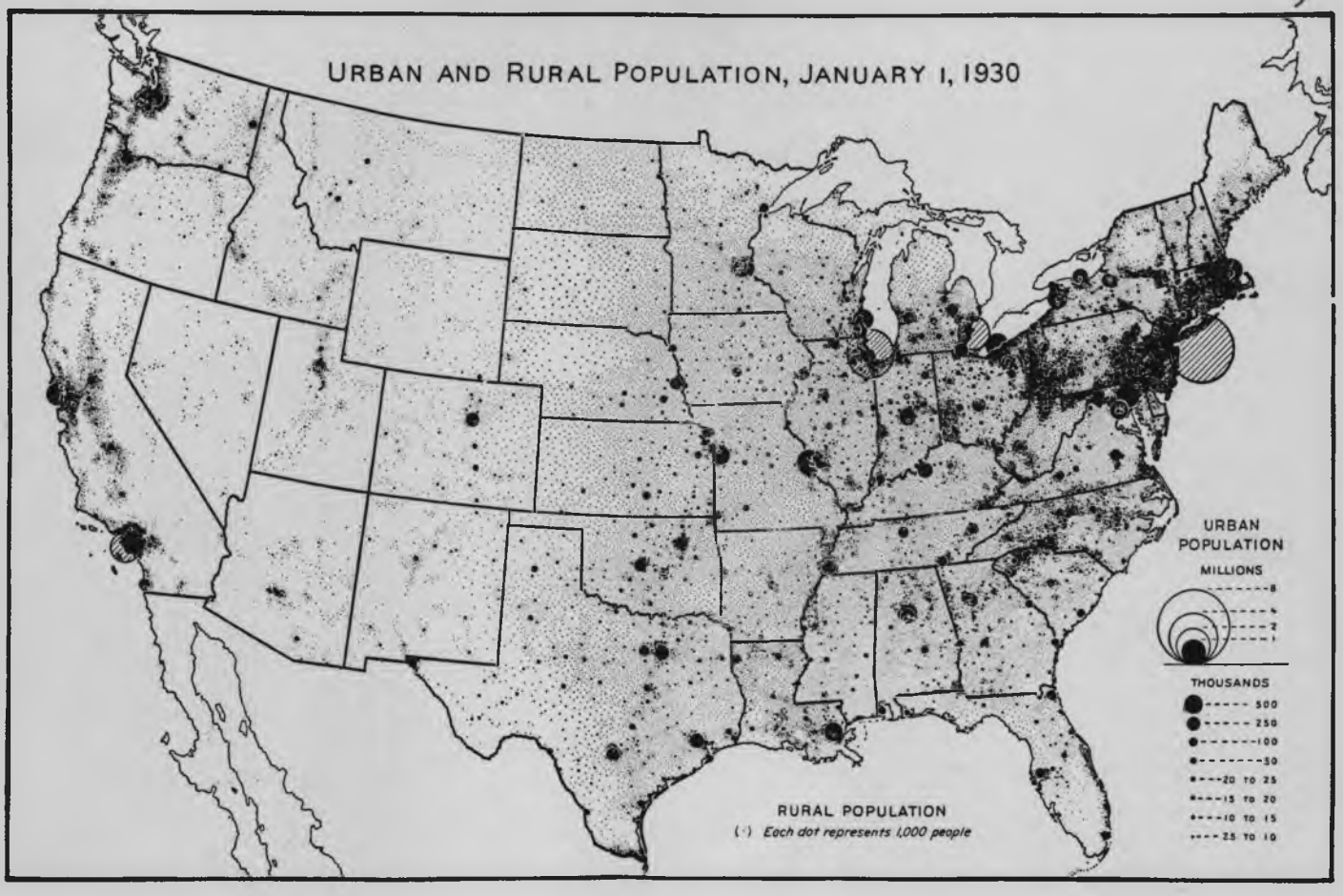
URBAN AND RURAL POPULATION, JANUARY 1, 1930
URBAN POPULATION
MILLIONS
8
4
2
1
THOUSANDS
500
250
100
50
20 TO 25
15 TO 20
10 TO 15
25 TO 10
RURAL POPULATION
(·) Each dot represents 1,000 people

Fig. 1

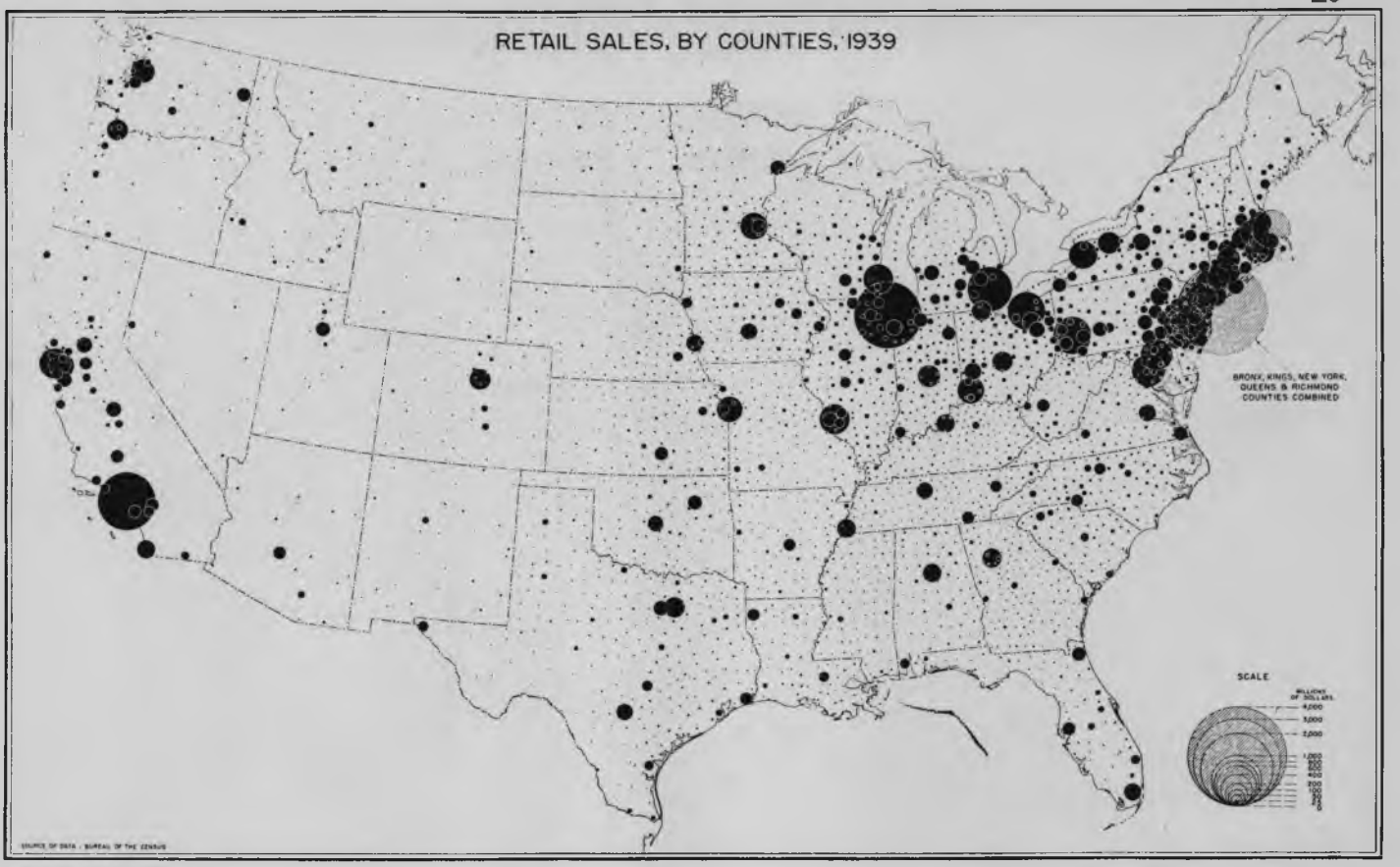
RETAIL SALES, BY COUNTIES, 1939
BRONX, KINGS, NEW YORK, QUEENS & RICHMOND COUNTIES COMBINED
SCALE

Fig. 2

are found in Florida, Louisiana, Tennessee, Colorado, Oregon, and Washington. All these areas of lesser importance are also connected with cities. Outside of the locations already described, retail sales are very small. Several states have no counties with retail sales of any importance. These are Nevada, Idaho, Montana, North and South Dakota, New Mexico, Wyoming, Mississippi and Vermont.

The third map is of per cent population change from 1930 to 1950 (Fig. 3).[3] The average population change for the United States during the period covered by this map was an increase of 23%. Certain definite areas show increase above average. These are Michigan, the Chesapeake Bay area, Florida, and the entire western part of the country west of Wyoming and including New Mexico and Texas. Three areas show increases greatly above average. One is the West Coast including Nevada and Arizona. The other two are Florida and the District of Columbia. Geographic progression is shown by the fact that areas of average population increase are generally found next to areas above average. In the West, states of average increase are Wyoming and Colorado. Adjacent to Texas is Louisiana in this category. Along the East Coast, Connecticut, New Jersey, North Carolina and Tennessee, all continuous with the Chesapeake Bay area, show average increase. Only Florida does not have adjacent areas of average increase. New Hampshire is an isolated state of average increase not next to any areas of above average increase. Increases of population greatly below average in this case are actual decreases in population. States with population decreases are confined to the

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3. All of the remaining maps used in this study, unless otherwise stated, will be prepared in the same manner. The numerical variations plotted on them will be divided into average, above average, greatly above average, below average and greatly below average. Average will be approximately 10% of the distribution around the national average. Above and below average will be about 20% of the distribution on either side of average. Greatly above and greatly below average will be the remaining part of the distribution. Adjustments will be made where the national average does not fall near the midpoint between the extreme numerical values.

PER CENT POPULATION CHANGE 1930-1950

GOODE'S SERIES OF BASE MAPS AND GRAPHS. THE UNITED STATES OF AMERICA, ON THE CONIC PROJECTION. NO.10

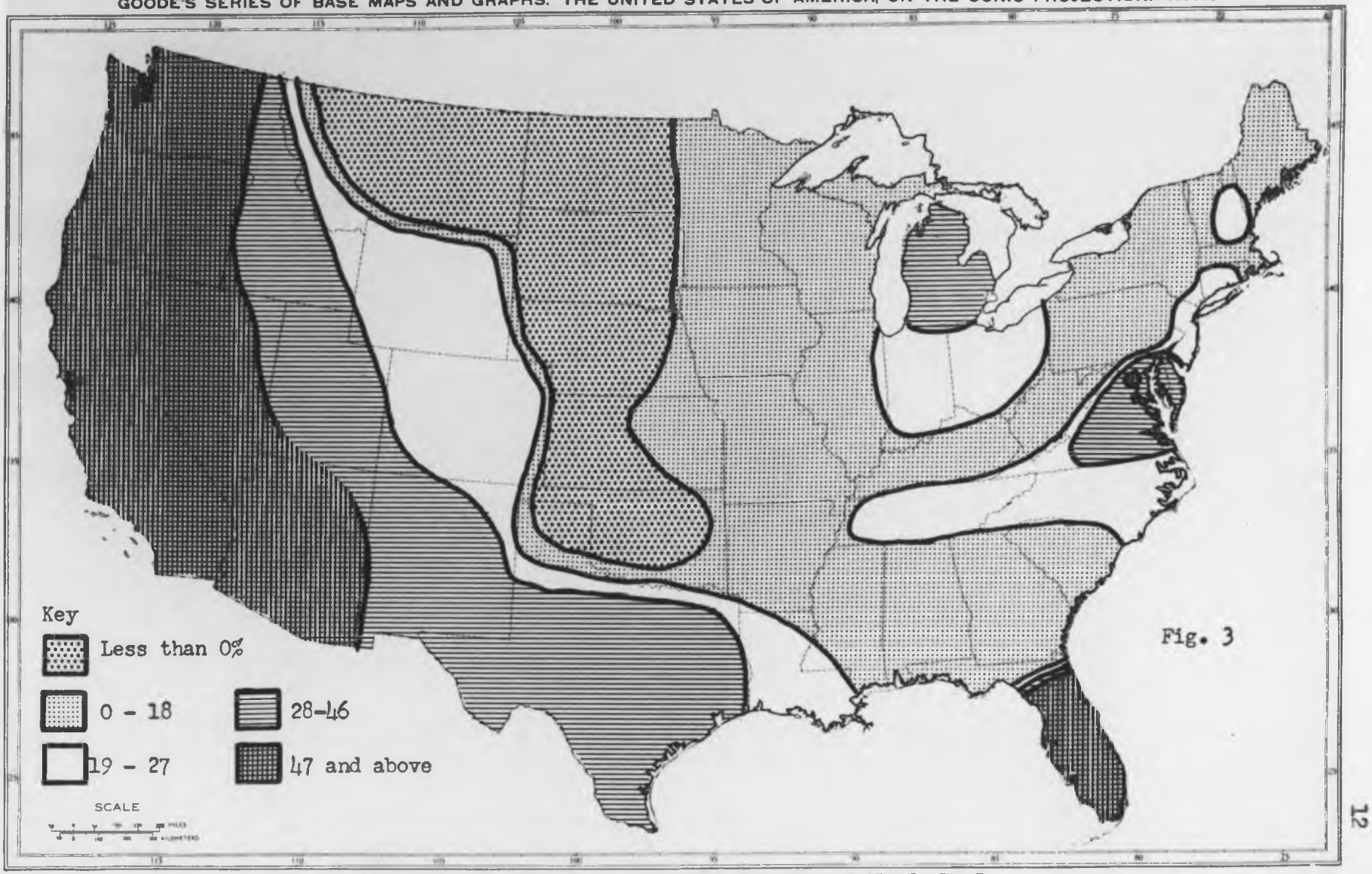


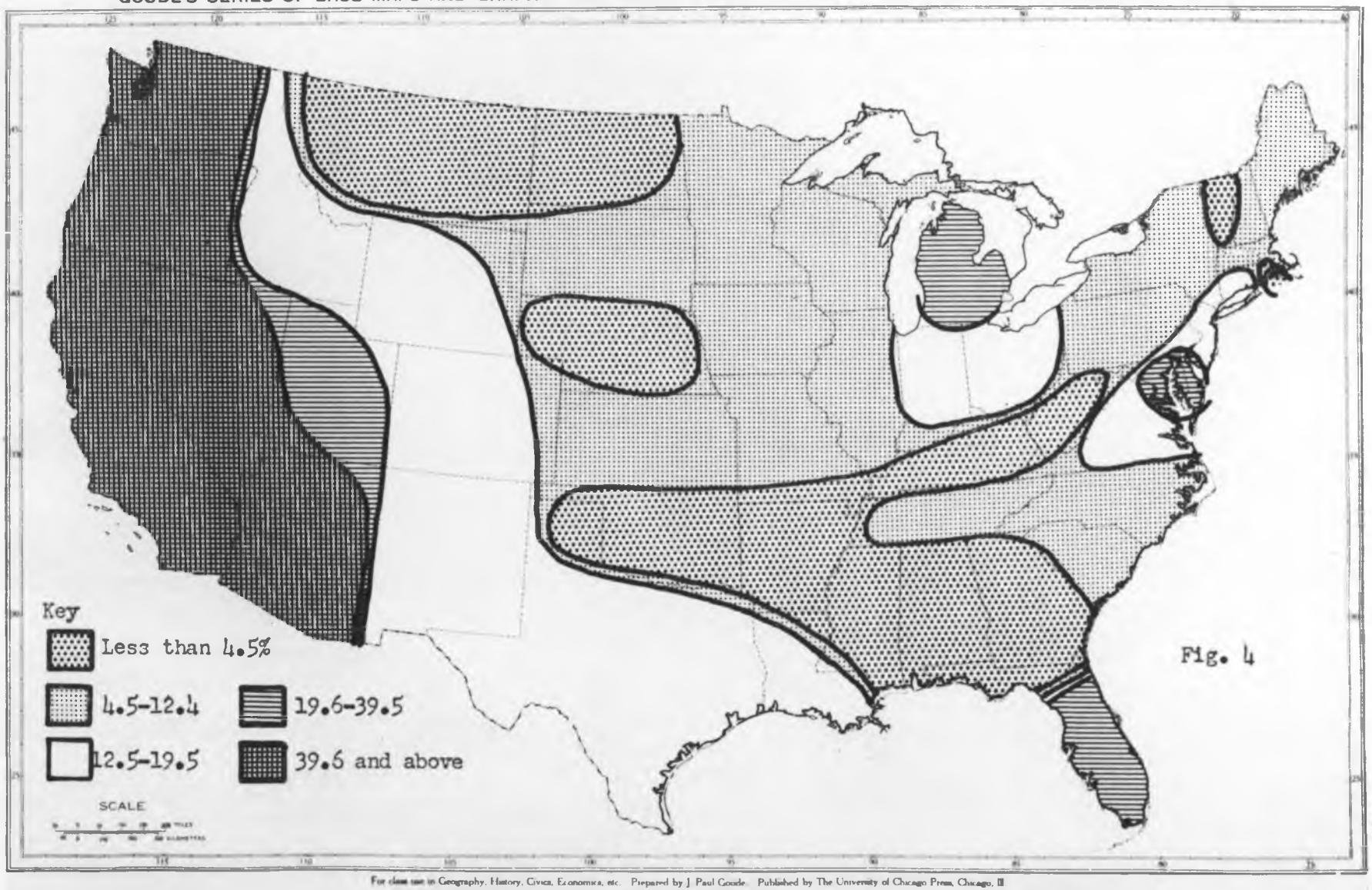
Fig. 3

Plains States. These states include a strip from Montana to Oklahoma, interrupted only by Kansas, which had a slight increase in population. All the states west of this area were average or better. The remaining states, all lying to the east of the Plains had increases below average. This includes the Middlewest states; in this case Minnesota, Wisconsin, Iowa, Illinois, and Missouri; a long strip of states from Maine to Kentucky, and the Deep South; and a strip of states from South Carolina to Arkansas.

The fourth map in the first series is of the per cent of population change in the United States between 1940 and 1950 (Fig. 4). The average change in this period was an increase of 14.4%. Above average increases are again found in distinct areas. One of these is the West Coast, including Nevada, Arizona and Utah. Others are Michigan, the upper Chesapeake Bay area, and Florida. The only area with population increase greatly above average is the West Coast. This includes all the states mentioned above except Utah. A belt of average increase is found from Louisiana to Idaho. Other areas of average increase are the East Coast from Connecticut to Virginia, and the states, Ohio and Indiana. All of these areas are associated with areas of above average increases in population. The rest of the country had increases less than average or had actual decreases. Increases designated as greatly below average on this map include very small increases and actual decreases. Such places were scattered from the Plains states through the South and into New England. These include Montana, North Dakota, and Nebraska within the Plains area; a group of states from Oklahoma to Georgia, plus Kentucky and West Virginia in the South; and Vermont and Rhode Island in New England. Areas with increases of less than average constituted the rest of the map. These include parts of the Plains states, Midwest, South and New England.

The map of population change between 1940 and 1950 is very much like the map of population change between 1930 and 1950. This is not surprising because

PER CENT POPULATION CHANGE 1940–1950



more than two-thirds of the national increase took place in the latter decade. In addition, population change has been the same during both decades in many areas, in relation to the national average. There are several notable differences between the two maps. Almost the entire South including West Virginia is one step lower with relation to the average in the second decade, when compared to both decades. Several states in New England are also one step lower. Several states in the West that were above average in both decades became average in the second. Only the state of South Dakota improved its relative standing with respect to average. This was an increase from greatly below average to below average. The reason that practically all changes were to a lower position is due to the fact that the West Coast, which led the nation in both decades, was even farther from average in the second decade. The second decade is the most important to this study, since it shows only the more recent trends in population change.

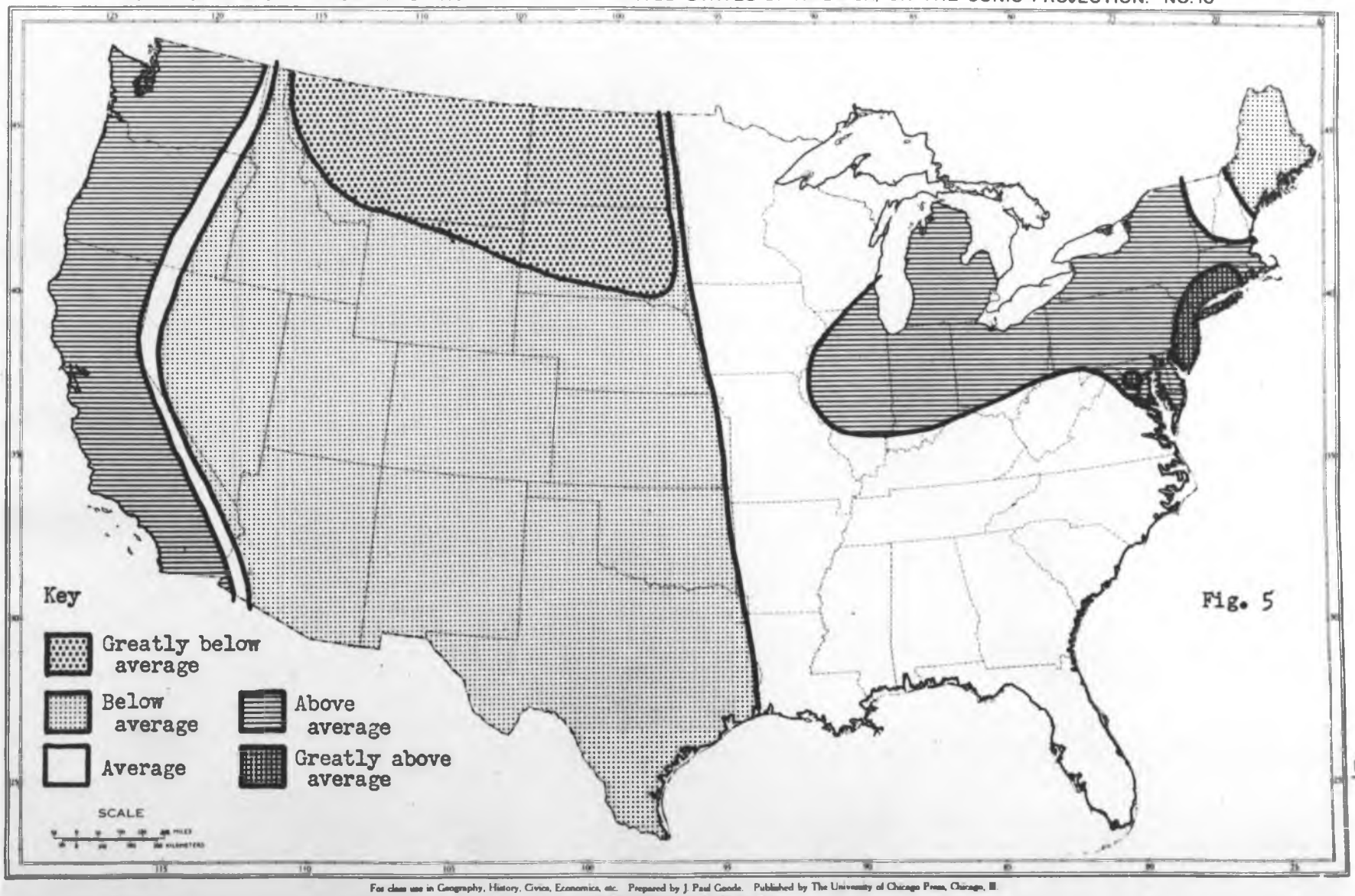
The first group of maps described allows several conclusions in terms of the general picture of market and population. The detail described in the first two maps shows that within each state, population and retail sales are concentrated in the urban centers. This is strengthened by the fact that farmers buy very little of the refrigerated items sold in grocery stores. Other studies show a close correlation between rural areas and the sale of home freezing equipment. Retail sales will be considered further in the second group of maps where more specific data is available. The other maps, population density and population change, can be compared to give a composite picture of strength and weakness in terms of numbers of people, and therefore, of potential market size. Major emphasis in comparing these is given to population density. In any ten-year period between censuses, population change will be only a fraction of the total population except in extreme cases. Also, the counter effect of the existence of relatively new units of other types of refrigeration equipment lessens the importance of

population increase as expanding the potential market in this period. According to this composite picture (Fig. 5), the only areas that can be called greatly above average are several states along the Eastern Seaboard. These are Connecticut, New Jersey, and the District of Columbia. There are two areas which can be considered above average. One is a belt from Massachusetts and Maryland to Illinois. The other is the West Coast. Except for Maine and the areas already described, the entire eastern half of the country east of the Prairie states (North Dakota to Texas) is average strength. Maine and the entire western half of the country minus the coast states, are below average. Three states, Montana and the Dakotas, are greatly below average.

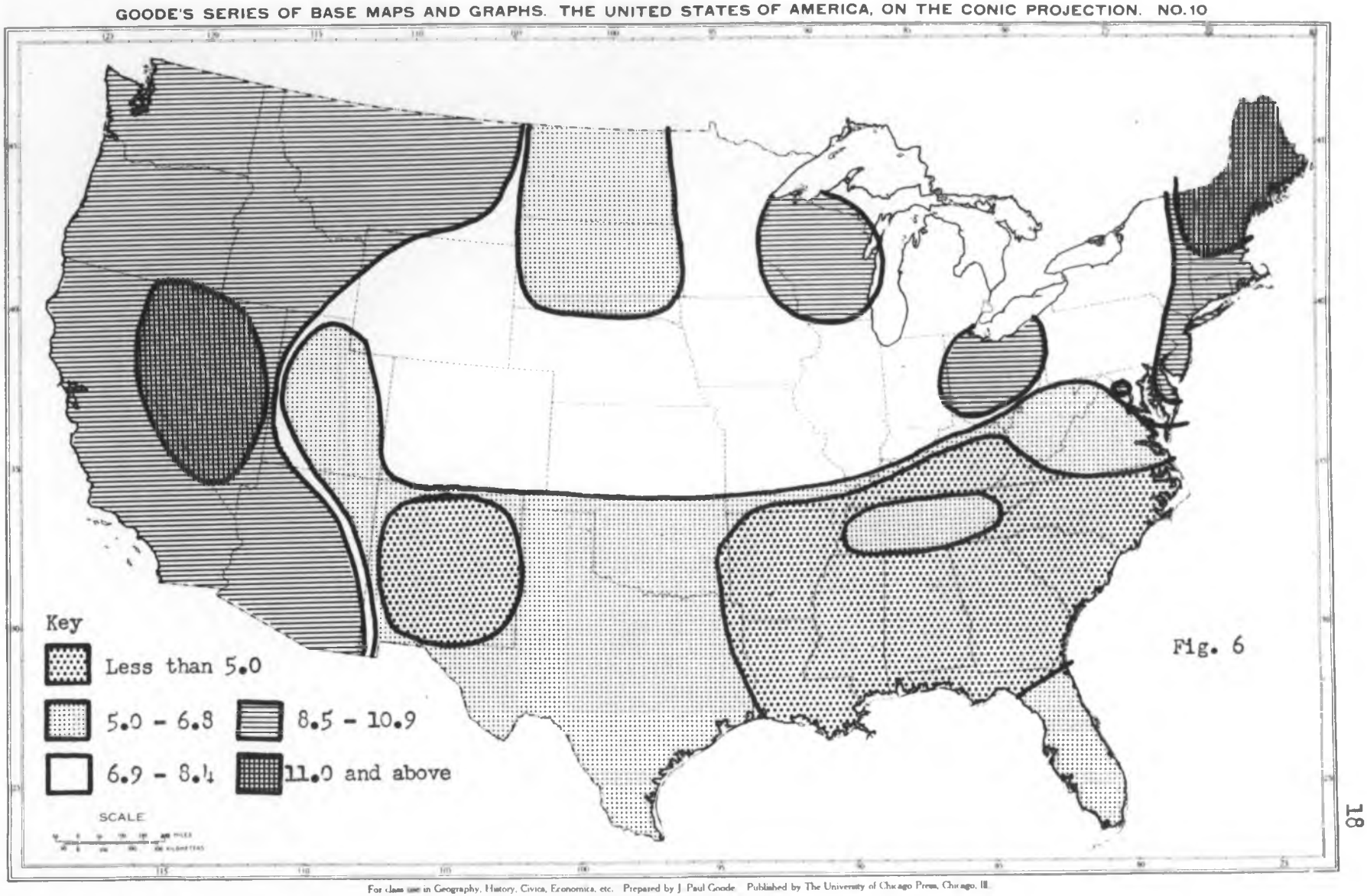
The first map to be presented in the second group is of the number of grocery stores per 10,000 people, by states, in 1939 (Fig. 6). The average for the United States was 7.3. There are two areas on this map which are greatly above average, Upper New England and Nevada. Two other areas and two separate states are above average. The first area is the East Coast from Massachusetts to Delaware and the District of Columbia. The second area is the West Coast, including Montana, Idaho, and Arizona. The other two states are Ohio and Wisconsin. Areas greatly below average are New Mexico and most of the South east of Texas. In the South the states, Virginia, West Virginia, Tennessee, Florida, Texas, and Oklahoma are below average. Other states below average are Utah and the Dakotas. The rest of the country has an average number of stores in relation to population. This remaining area extends in a belt from New York to Wyoming, excluding the states already mentioned belonging in this area.

The second map shows the total sales of refrigerated commodities per store in 1939 (Fig. 7). The average for the country was $5,300. Three states, New York, California, and Nevada, are greatly above average. Rhode Island, the District of Columbia, and a group of states in the West are above average. These

COMPOSITE PICTURE OF POPULATION



GROCERY STORES PER 10,000 PEOPLE 1939



SALES OF REFRIGERATED FOODS PER GORCERY STORE 1939

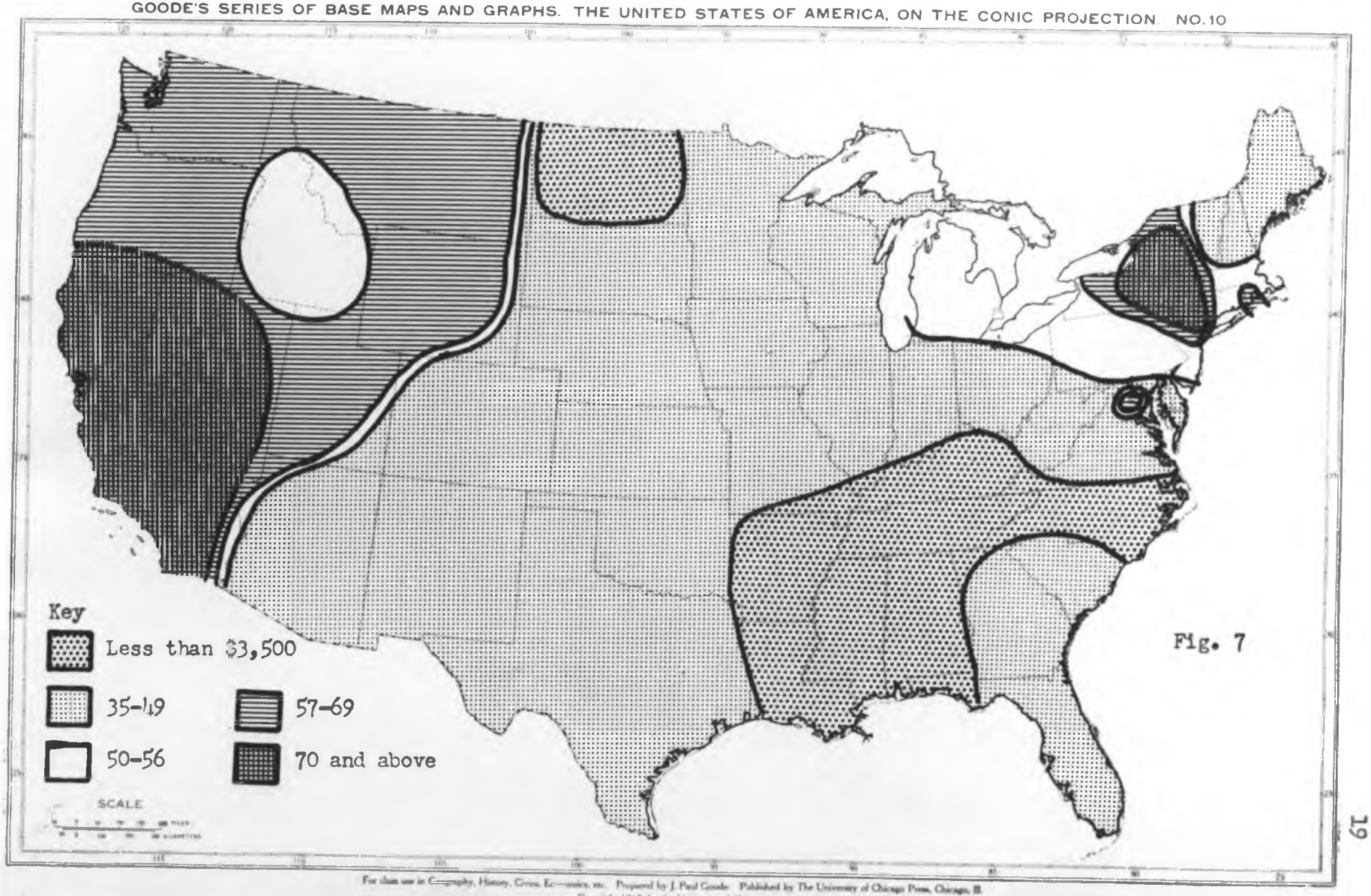


Fig. 7

Western states are Oregon, Washington, Montana, Wyoming and Utah. Idaho in the West and Michigan, Pennsylvania, New Jersey, Connecticut, and Massachusetts in the East are average. The rest of the country is below average. This includes all the area from Arizona and the Dakotas to Delaware and Florida. Of this, North Dakota and a wide area in the South are greatly below average. This includes Kentucky and all the states south of it and east of Texas except South Carolina, Georgia and Florida.

The third map gives the per cent that refrigerated commodities were of the total sales of the store in 1939 (Fig. 8). The average for the United States was 9.2%. New York and Washington are greatly above average. New Jersey, the District of Columbia, and the rest of the West Coast are above average. Montana and Nevada in the West and a belt of states in the northeastern part of the country are average. This belt includes Minnesota, Wisconsin, Michigan, Pennsylvania, and southern New England. The rest of the country is below average. North Dakota and practically all of the South are greatly below average. The area in the South includes New Mexico and Missouri, but not Oklahoma, West Virginia, Virginia and South Carolina. The remaining area which is merely below average includes upper New England, a belt from the East Coast at Delaware to Iowa, and much of the Plains and Mountain states.

The three maps in the second group present a pattern of the strength and weakness of the characteristics of grocery stores which directly affect the potential market for open display cold storage equipment. One map is of the density of stores in terms of population, and the other two are concerned with the part of a store's sales that are refrigerated items. Where stores are common and where sales of refrigerated items are high, a good market for open display equipment exists. Where sales of refrigerated items are low, it is possible that in many cases the market could be expanded. If there is a direct relationship between en-

PERCENT THAT REFRIGERATED FOODS ARE OF THE TOTAL SALES
OF GROCERY STORES 1939

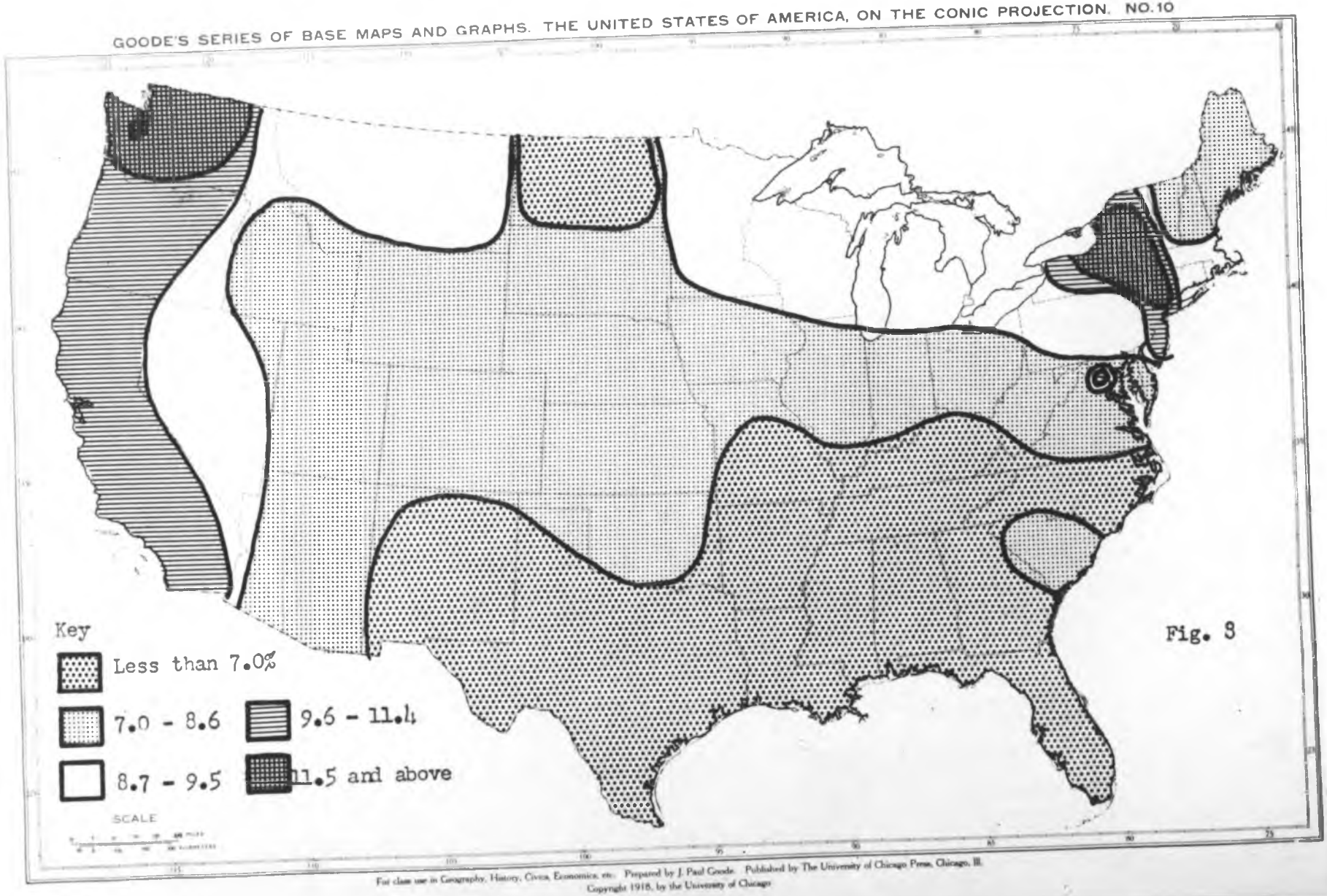
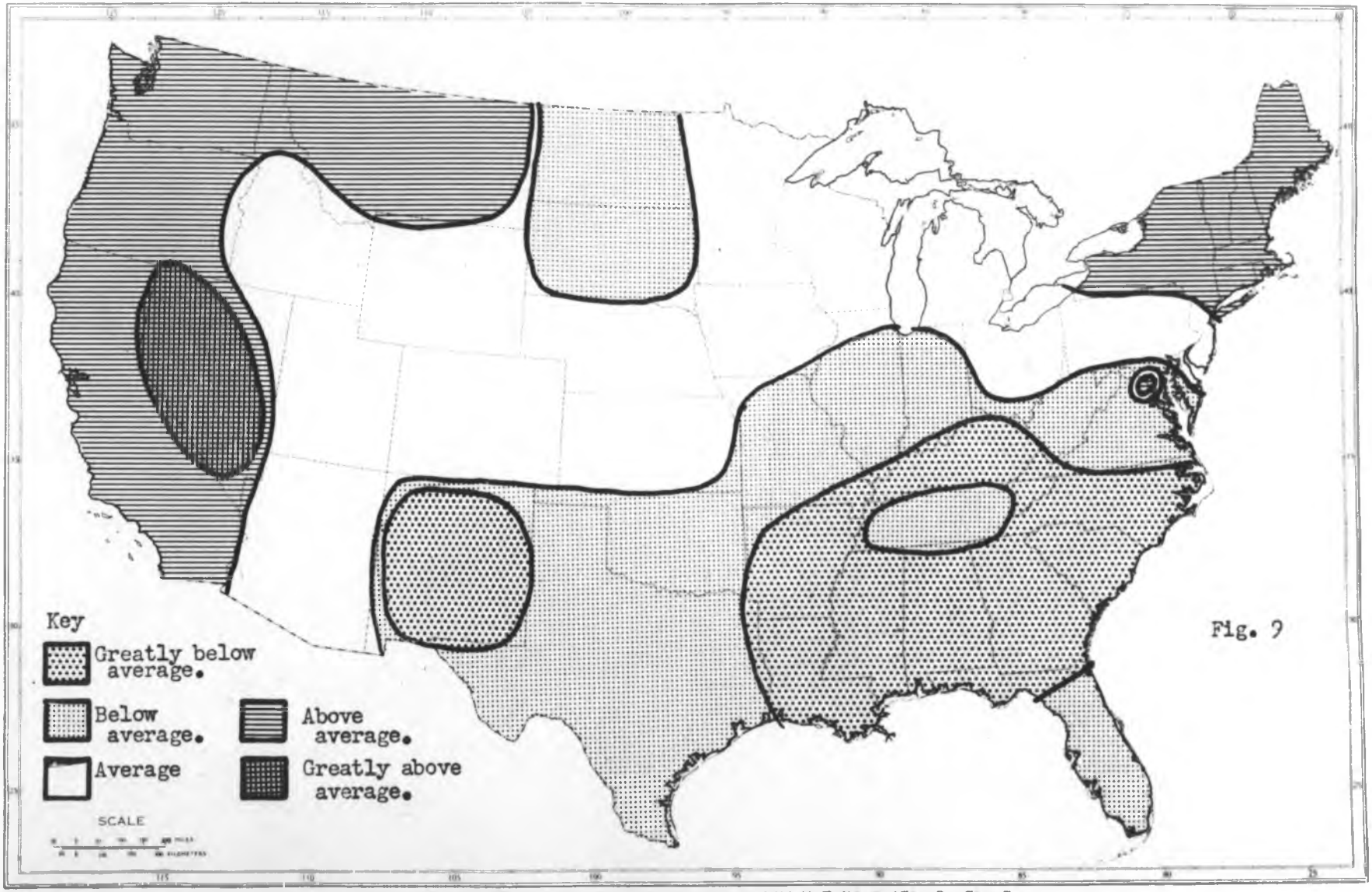


Fig. 8

panding markets of refrigerated items and open display equipment, then these areas represent potential markets for open display equipment. In comparing these three maps to gain a composite picture, the map showing the number of stores per 10,000 people was given double weight to make it on a par with the other two maps showing two phases of the same thing. When the average fell halfway between two categories, the per cent that refrigerated items was of the total sales of a store was disregarded. This is because the total sales of a store of refrigerated foods are more likely to determine the purchase of refrigeration equipment than the per cent of the total sales, on one hand, and sales characteristics only modify the store as the market for this equipment, on the other. In the composite picture (Fig. 9), only Nevada was consistently greatly above average. Two areas, as well as the District of Columbia, were mainly above average. One of these two areas is the West Coast and Montana. The other is New England and New York. New Mexico and most of the South east of Texas were consistently greatly below average. In the South, Florida, Tennessee, West Virginia and Virginia were mainly below average. Adjacent to the South several states including Texas and Oklahoma were mainly below average. These are Missouri, Illinois, Indiana and Maryland. The Dakotas were also below average. The remaining states were generally average. All of the average states are connected in an arc across the country which becomes wider in the West. This arc extends from New Jersey to Arizona.

All of the data presented in the two groups of maps can now be brought together to form a composite picture of the strength and weakness as it varies within the United States for potential use of open display cold storage equipment in terms of the grocery store as the principle user. The first thing that can be pointed out is that all of these maps tend to regionalize and that there is a geographical progression of characteristics. For the most part, similar characteristics plotted on these maps tend to lie next to each other, and there are few

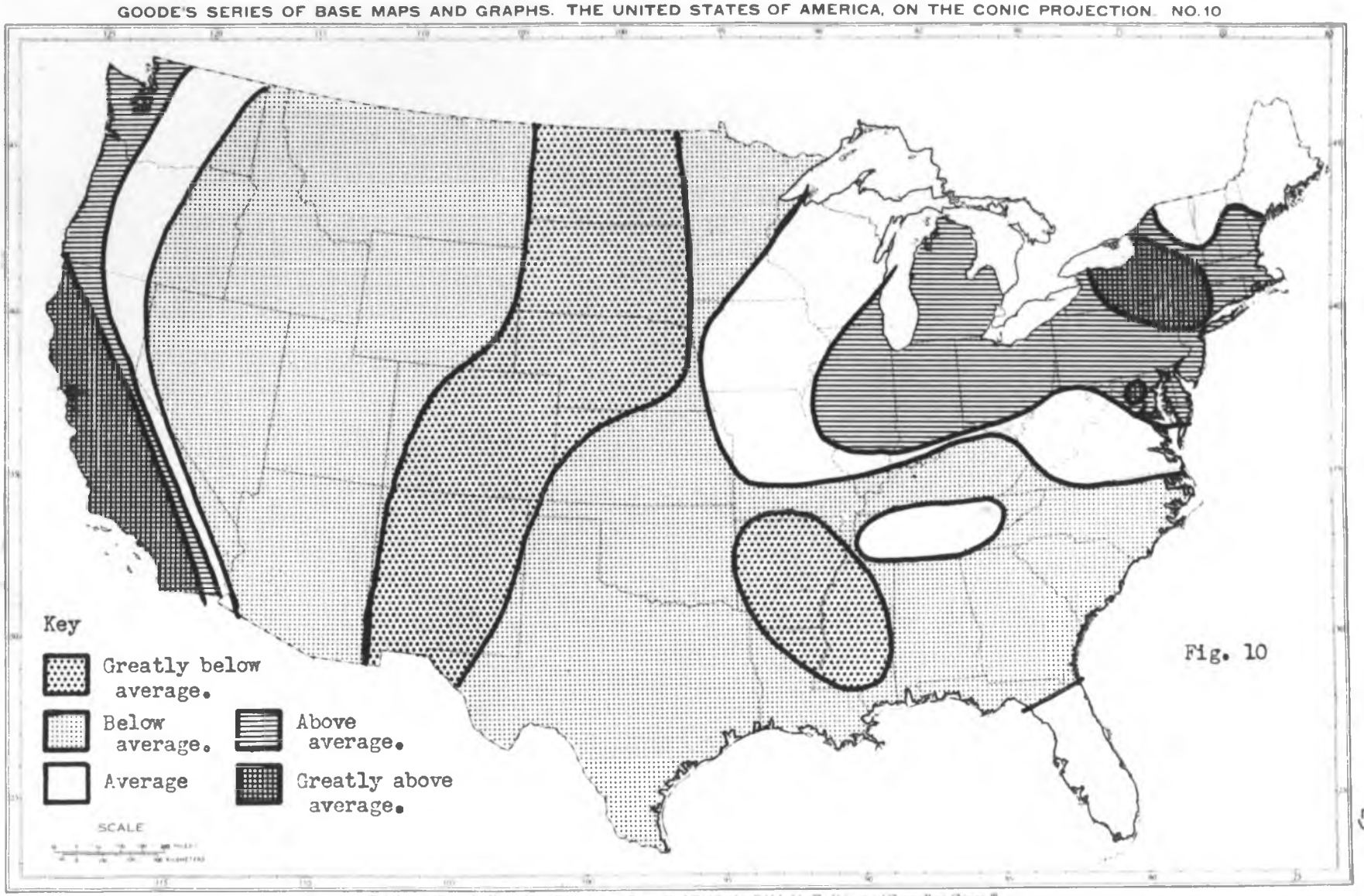
COMPOSITE PICTURE OF GROCERY STORES



places where any adjacent areas had sharp differences of characteristics. The maps in the first group showing distribution by states gave population density and change. These were compared and major emphasis was given to population density. The second group of maps showed the distribution of grocery stores and their sales characteristics in terms of refrigerated foods. Comparison of these maps gave even weight to distribution and sales characteristics. Grocery store distribution was in terms of population. Two of the important factors in the two groups of maps then are grocery store distribution in terms of population, and population density. If, when preparing a composite picture of both groups of maps, double weight be given to the second group, the effect is to have a map of grocery store density combined with refrigerated foods sales characteristics, double weighting store density. This is not quite the same as comparing the above mentioned characteristics directly, since other characteristics, such as population change, will have some effect on the final picture. No map was given of grocery store density alone, as it was thought that grocery store distribution in terms of population was a better way to present grocery stores. Nevertheless, grocery store density is important in the overall picture of the market for open display cold storage equipment. Consequently, the composite picture is being constructed so as to place major emphasis on grocery store density. The direct comparison of the results of comparing groups of maps tends to bring everything toward average, cancelling out variation. Thus, recourse was had to the individual maps to produce a more realistic distribution of strength and weakness for the market of open display cold storage equipment.

The map showing the composite picture of the grocery store as the user or ultimate market for open display cold storage equipment (Fig. 10) shows the same kind of geographic progression as the individual maps. Two definite areas are above average. One of these coincides with the "Industrial Belt," that is,

COMPOSITE PICTURE OF GROCERY STORES AND POPULATION



from New Hampshire and Maryland to Illinois. The other area is the West Coast. New York, California, and the District of Columbia are greatly above average. Average states are Oregon and Washington in the West; Wisconsin, Iowa and Missouri in the Midwest; Tennessee, West Virginia, Virginia, and Florida in the South; and Maine and Vermont in New England. The rest of the country is below average. The below average area is all connected and consists of practically all of the western half of the country plus the South. Within this area, a belt of states from New Mexico to North Dakota plus Arkansas and Mississippi are greatly below average.

The Intermediate Purchaser

Two types of organizations may make the actual purchase of an open display cabinet for placement in a grocery store. The first of these is the grocery chain store headquarters; the other is the producer of the refrigerated foods that are displayed in an open display cabinet. These organizations centralize the market considerably, but do not change the pattern of the ultimate user. Sales to these organizations are much preferred because they buy in quantity and savings to both parties to the transaction can be realized.

Chain grocery stores are found in practically all parts of the country. Although statistics were not available to show their distribution or their exact proportion of all grocery stores, it stands to reason that chain store headquarters are located in central positions within the major marketing areas, and that they are more likely to occur where retail sales are relatively high.

The producers of the refrigerated foods that are displayed in open display cabinets, are also found in practically all parts of the country. These producers include three main types, in terms of their products: ice cream, milk, and frozen foods. However, one producer may distribute two or more of these products. Being refrigerated items, these products cannot be transported easily for any

great distance. Therefore, one producer may operate in one city only, or in several larger towns. In each area, there are usually at least three or four ice cream producers and frozen foods distributors, while there may be even more milk producers. Thus, there are many thousands of these producers in the country, although only the larger of these producers is able to afford to absorb part or all of the cost of an open display cabinet.

The distribution of chain store headquarters and of the producers of refrigerated foods should be similar to the distribution of wholesale sales. Both of these organizations are in the nature of wholesale operators, since they distribute their products to grocery stores which are retail operators. Consequently, to gain a picture of the distribution of the headquarters and the producers, a prepared map of wholesale sales by counties in 1939 is presented (Fig. 11). This map is from the same source as the prepared maps used previously. Wholesale sales seem to be greatly localized in a few centers. All places with important wholesale sales on this map are the larger cities. Insignificant sales are shown in connection with the smaller cities. States with above average population density have an even greater proportion of the wholesale sales, while those with below average density have even less. A heavy distribution of sales is found in the belt from New York to Illinois. An area of secondary importance is California. Practically every state in the eastern half of the country has one or two important areas of wholesale sales. Only four states in the western half of the country besides California have any areas of important wholesale sales. These are Colorado, Utah, Oregon, and Washington.

The intermediate purchaser of open display cold storage equipment modifies the market considerably. This modification is almost entirely in terms of concentration in the larger cities because most intermediate purchasers operate entirely within the limits of a major marketing area. Consequently, the overall pattern

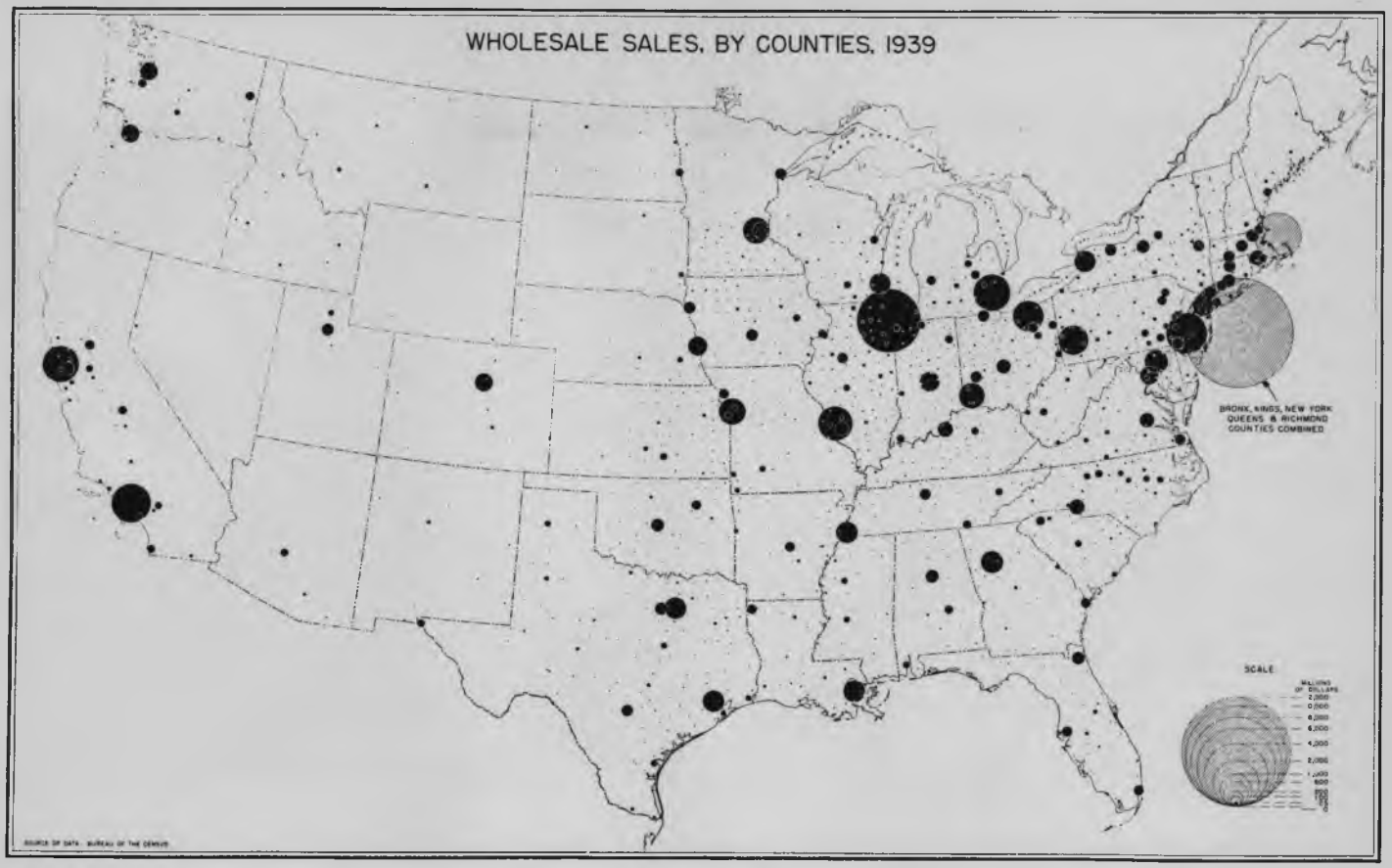

WHOLESALE SALES, BY COUNTIES, 1939
BRONX, KINGS, NEW YORK, QUEENS & RICHMOND COUNTIES COMBINED
SCALE

Fig. 11

for the user of open display equipment must remain substantially the same as described in the previous section. The intermediate purchasers potentially cover all grocery stores and are preferred markets.

However, no direct statistics were available on the distribution of the intermediate purchaser, so no direct comparison can be made with the previous section of this chapter on the grocery store as the ultimate user of this equipment.

Summary

In this chapter, an attempt has been made to present the geography of the user of open display cold storage equipment. This was done by presenting several maps and describing them in terms of the strength and weakness that each displayed in terms of potential use of open display equipment. There were two scales of results. The maps of the general picture of market and population showed great detail, indicating that the best potential markets were in urban areas, to a greater degree than population alone would indicate. The more specific maps illustrated statistics given by states, indicating strength in the northeast and the West Coast, and weakness in the West and South. The user of open display cold storage equipment was considered in this study to be the grocery store. Consequently, the more specific maps dealt primarily with the grocery store. Intermediate purchasers are important in the sales of open display cabinets because they usually own the cabinets that are bought and thus are the users of them, but the place of use remains the grocery store. Hence, the effect of the intermediate user is to concentrate sales in the larger urban areas.

CHAPTER III

The Products Merchandised in Open Display Cold Storage Equipment

The object of this chapter is to analyse the products merchandised in open display cold storage equipment, both as to their market, and the relation of this market to open display equipment. Statistics were gathered from all possible sources for this part of the thesis, but unfortunately, many statistics that would be very significant, do not exist. First, the general picture of all products will be considered, followed by a section on each of the three main types of refrigerated foods: ice cream, dairy products, and frozen foods.

The General Distribution

For the general distribution of the market of all products, a map of the value of refrigerated foods merchandized through grocery stores per capita in 1939 is given. When the grocery store was being considered, a map of the value of refrigerated foods sold per store was presented. The data for the map being presented in this section are from the same source, the Census of Business in 1939. This map gives an accurate picture of sales which potentially could be made through open display cabinets. As when presenting the number of grocery stores, this map compares sales to population rather than to area. Density is the most important factor in the distribution of sales. Nevertheless, sales are closely tied to population in any area, and population changes. Thus comparisons can be made for different times when the change of population is known. Also, other data are given in terms of population. Each type of refrigerated food makes up a part of the total sales. Each, however, has other outlets which are not adaptable to open display. Thus, it is impossible to break the total sales down into their component parts. The map of total sales of refrigerated foods is, therefore, the only map

which has a direct relationship to potential sales through open display.

The map of the value of refrigerated foods merchandised through grocery stores per capita in 1939 shows great regionality, (Fig. 12). The average for the United States was $3.84. New York, the District of Columbia, and the West Coast was greatly above average. New England, New Jersey, and a group of states in the Northwest, Idaho, Montana, and Wyoming are above average. Adjacent to the areas above average are the average areas. In the east is a group of states from Delaware to Minnesota, including Illinois; and in the west, the states Arizona, Utah, and Colorado are all in this category. The remaining area is below average. This area is all in one unit and consists of the Plains states and the entire South. Two areas are greatly below average. One is North Dakota and the other is most of the South, including Kentucky and all of the states south of it and east of Texas, except Florida.

The general picture of the market for all products merchandised in open display cold storage equipment shows great regionality according to the map presented. The West Coast and the Northeast have sales above average while the Plains and the Southern states are below average. This pattern is very similar to the pattern of strength and weakness of the user of open display equipment developed in the last chapter.

Ice Cream

Of the three major types of refrigerated foods, the market for ice cream can be most accurately pictured. This is because most ice cream is consumed near the point of production and the ice cream industry is old enough that production figures are assembled in some detail. There will be three parts to this section of the chapter. The first will be two maps of ice cream production, one for 1939 and the other for 1948. The second part will be a map of trends in ice cream pro-

SALES OF REFRIGERATED FOODS BY GROCERY STORES PER CAPITA 1939

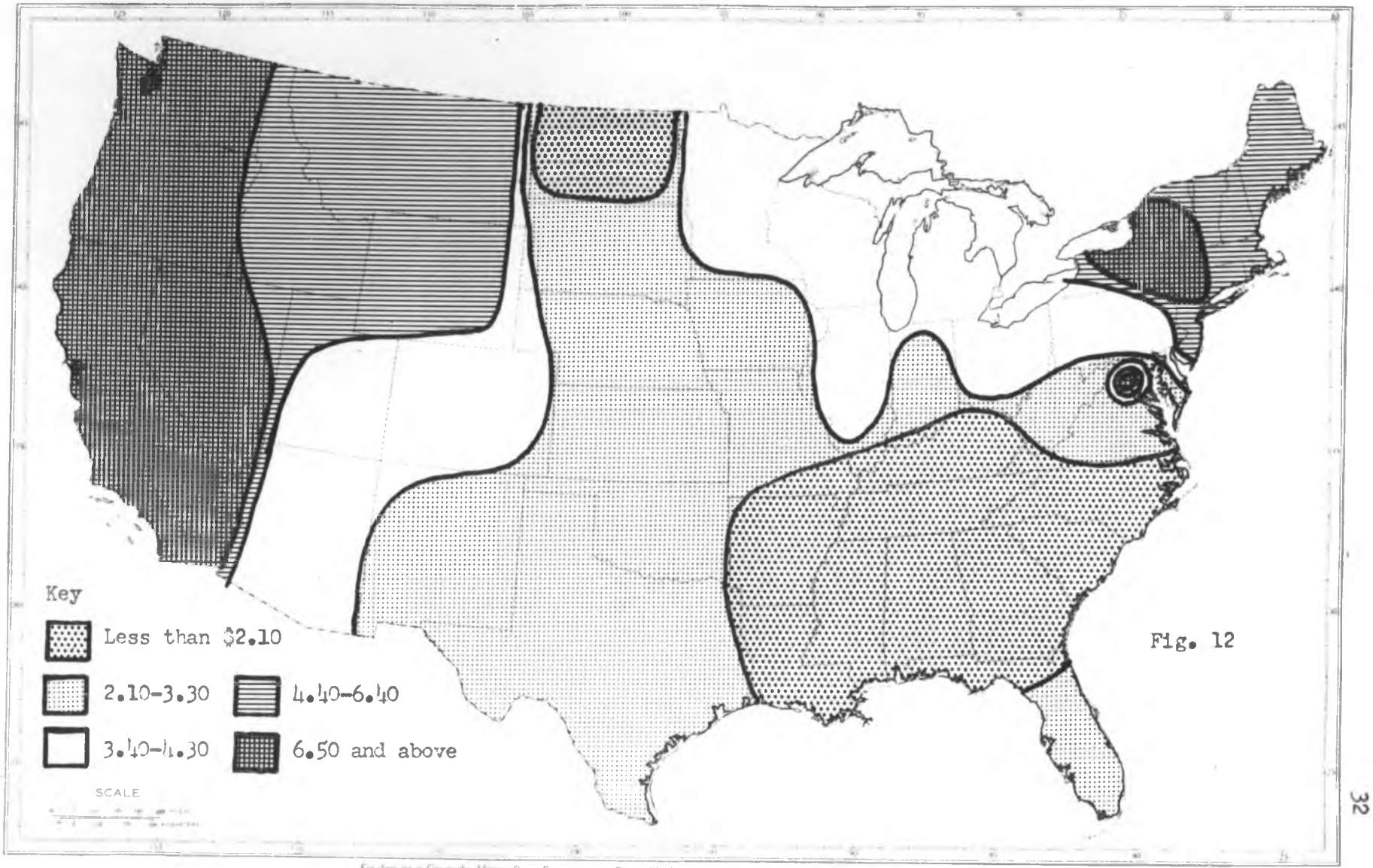


Fig. 12

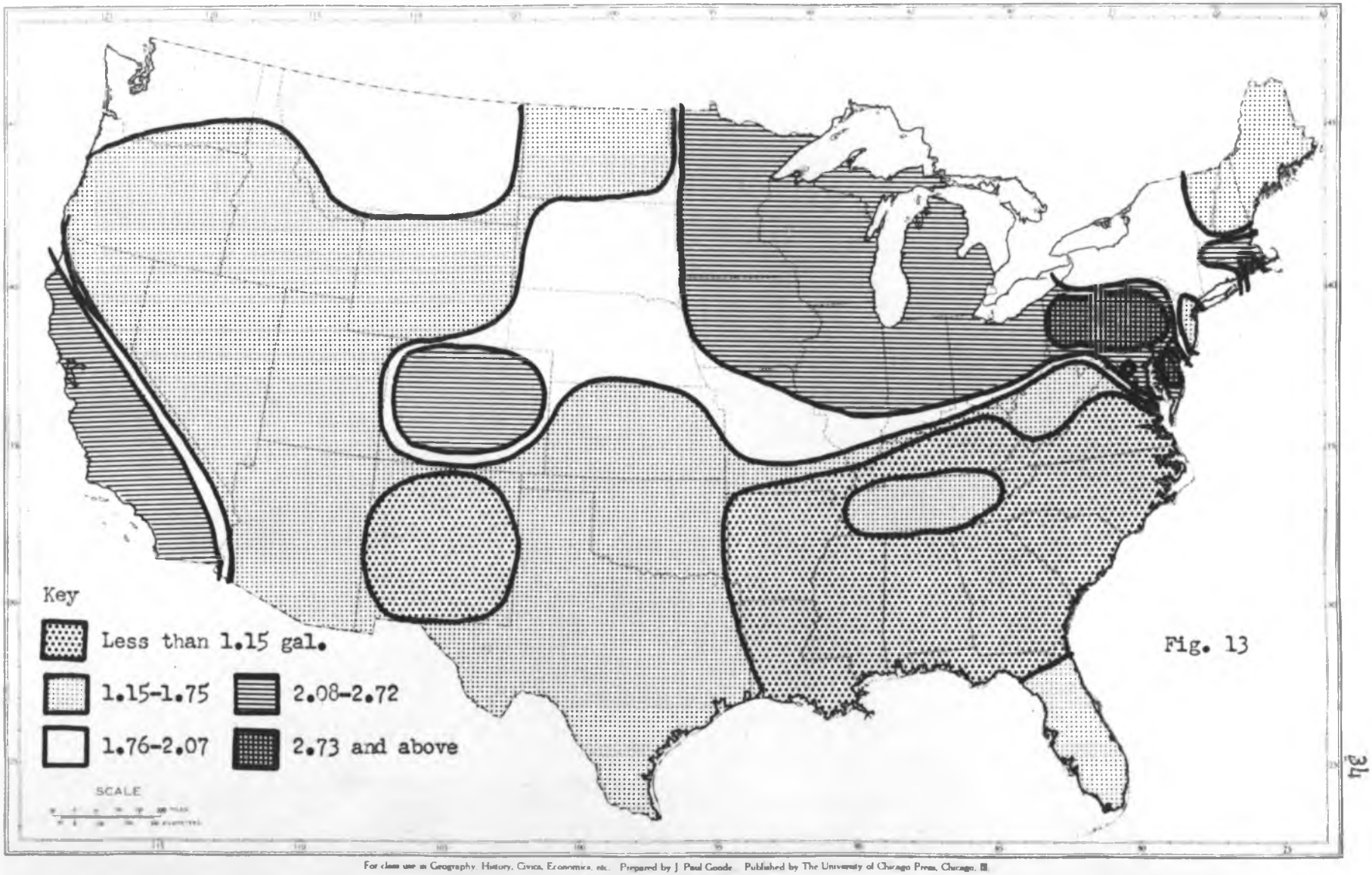
duction between 1939 and 1948, and the third will consider the proportion of ice cream sold in packaged form. The first two parts show the approximate distribution of ice cream market, and the third shows the relation of that market to open display equipment.

The data used in this section came from several sources. Ice cream production for 1948 and estimates for 1949 were received from The Ice Cream Trade Journal. Estimates for the proportion of ice cream sold in packaged form were obtained through correspondence from 28 marketing areas. It should be remembered that estimates used in this and subsequent sections are not reliable and are used in lieu of not having any information at all.

The first map is of ice cream production by states in 1939 in gallons per capita (Fig. 13). 1940 population figures were used, however. Average production for the United States in 1939 was 1.91 gallons per capita. The District of Columbia, Delaware, Pennsylvania and Rhode Island had production greatly above average. Massachusetts, Maryland, the Midwest, Colorado and California were above average. The Midwest includes the states from Minnesota and Iowa to Ohio. Connecting most of the areas that were above average, are the average states. This includes Connecticut and New York in the east, and Missouri, Nebraska, and South Dakota in the west. Montana and Washington were also average. The rest of the country was below average. This includes upper New England, New Jersey, the South and most of the West. Areas greatly below average include New Mexico and all of the South south of West Virginia and east of Texas, except Tennessee and Florida.

The second map is of ice cream production in 1948 (Fig. 14). The population figures used were estimates for 1950. Average production for the United States in 1948 was 3.78 gallons per capita. The District of Columbia, Delaware, Pennsylvania and Rhode Island are greatly above average. Areas above average include Massachusetts, Montana, and a large area extending from Colorado to Ohio

ICE CREAM PRODUCTION PER CAPITA 1939



ICE CREAM PRODUCTION PER CAPITA 1948

GOODE'S SERIES OF BASE MAPS AND GRAPHS. THE UNITED STATES OF AMERICA, ON THE CONIC PROJECTION. NO.10

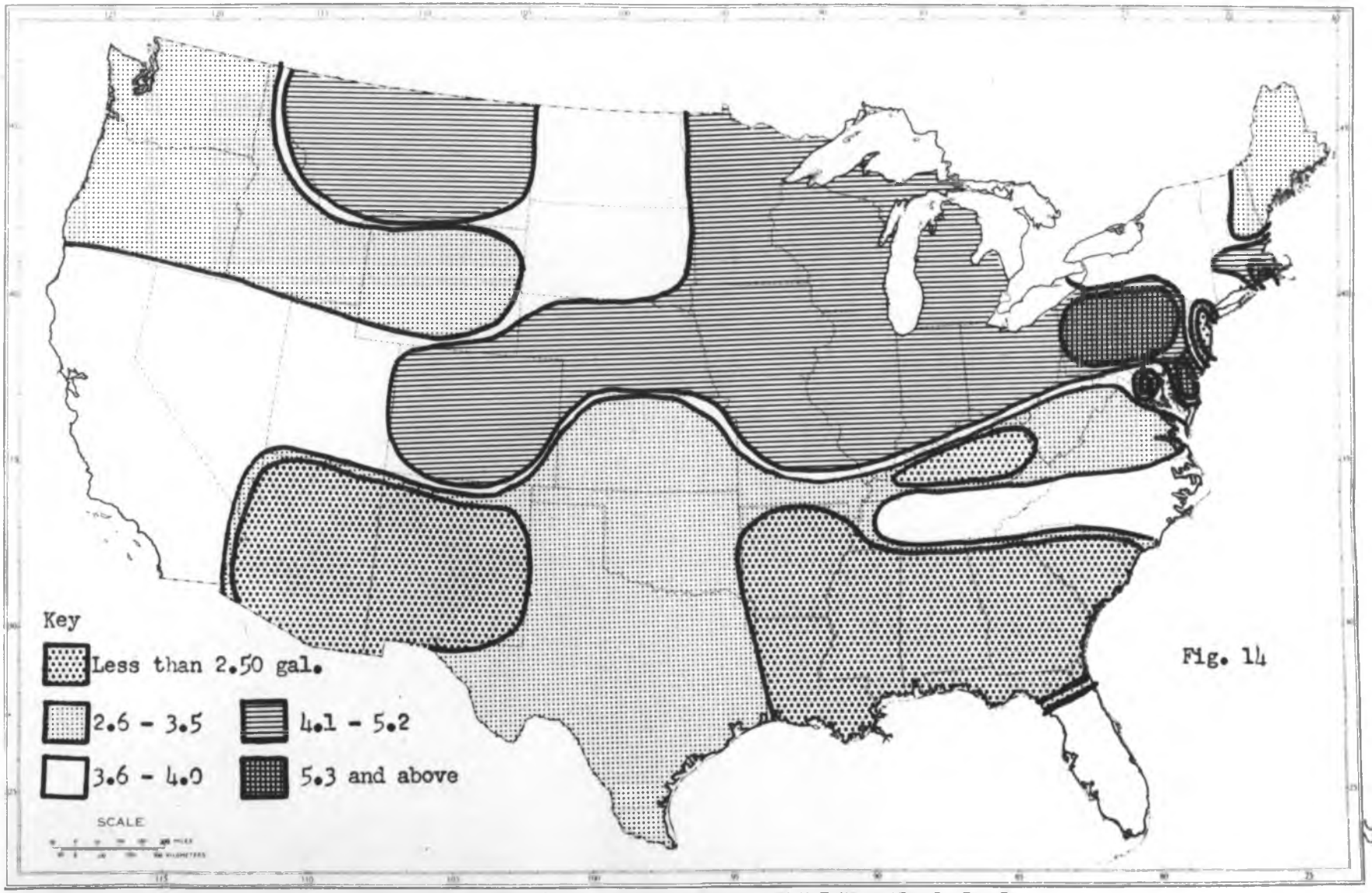


Fig. 14

and Minnesota. Average areas are scattered, but some are adjacent to the above average areas. These are Vermont, New York, Connecticut, and Maryland in the East, and the Dakotas, Utah, Nevada and California in the West. Other average areas are North Carolina, Tennessee, and Florida. The remaining areas are below average. These areas are also scattered and include parts of New England, the South, and the West. Four areas are greatly below average. These are New Jersey, Kentucky, Arizona, and New Mexico, and an area from South Carolina to Louisiana and Arkansas.

Production of ice cream shows a certain amount of regionality. Upper New England is below average; a belt of states from Massachusetts to Iowa is generally above average; the South is generally below or greatly below average; whereas the West is generally average or below average. There are no great differences between the patterns for per capita sales for the two different years described. More than half of the states maintained the same relative position with respect to average. Only one state, North Carolina, changed position more than one place. Several West Coast states were in a lower position with respect to average on the second map. These are Washington, California, and Arizona. On the other hand, many Western states moved to a higher place with respect to average. These are Montana, North Dakota, Nebraska, Utah, and Nevada. Several states between the South and the North also moved to a higher position. These are Missouri, Tennessee North Carolina, and Virginia. Florida and Vermont were in a higher position, and New Jersey and Maryland were in a lower position. These changes had some effect on the overall pattern. The states of Kentucky, West Virginia, and Virginia were separated as areas below average from the Deep South. A wedge of average or above was driven from the Midwest to the West Coast separating below average areas to the south and the north. The West Coast's position as higher than the interior was eliminated. Many of the changes described are no greater than yearly fluctuations. The major breakdown of the regionality of this pattern occurs among the small

eastern states.

Interstate movement of ice cream is a factor here. Another factor is the yearly fluctuations in production. Sixteen states changed their position with respect to average between 1939 and 1948, while estimated production figures for 1949 indicate that nine states changed their position with respect to average between 1948 and 1949. A better map of production would be an average of several years.

The third map is of trends in ice cream production by states between 1939 and 1948 (Fig. 15). Production for the United States in 1948 was 198% of 1939 production, according to the figures used. Three areas were greatly above average. Most of the South including the states from Virginia to Arkansas and Florida, but not South Carolina, constitutes one of these areas. Nebraska and the two states, North Dakota and Montana, are the other two areas. Upper New England and a great swath of states connecting those greatly above average, are above average. Three areas are average. One of these is the Midwest, including Missouri, Iowa, Minnesota, Wisconsin, and Illinois. Another is Texas, and the third is New York and Connecticut. Below average areas include most of the states from Massachusetts and Maryland to Michigan and several West Coast states. Below average states are Massachusetts, Pennsylvania, Arizona, and California. States greatly below average are Rhode Island, New Jersey, Delaware, Maryland, the District of Columbia, Ohio, and Washington.

Trends in ice cream production as described in the above paragraph show some regionality. The Northeast and the West Coast are generally below average. The Midwest is average. The South is generally greatly above average and the balance of the West is generally above average. The scattering of the characteristics is no greater than that of the yearly production figures. The figure for the United States as a whole shows that production doubled between the two years.

PERCENT THAT 1948 PER CAPITA PRODUCTION OF ICE CREAM IS OF
1939 PER CAPITA PRODUCTION

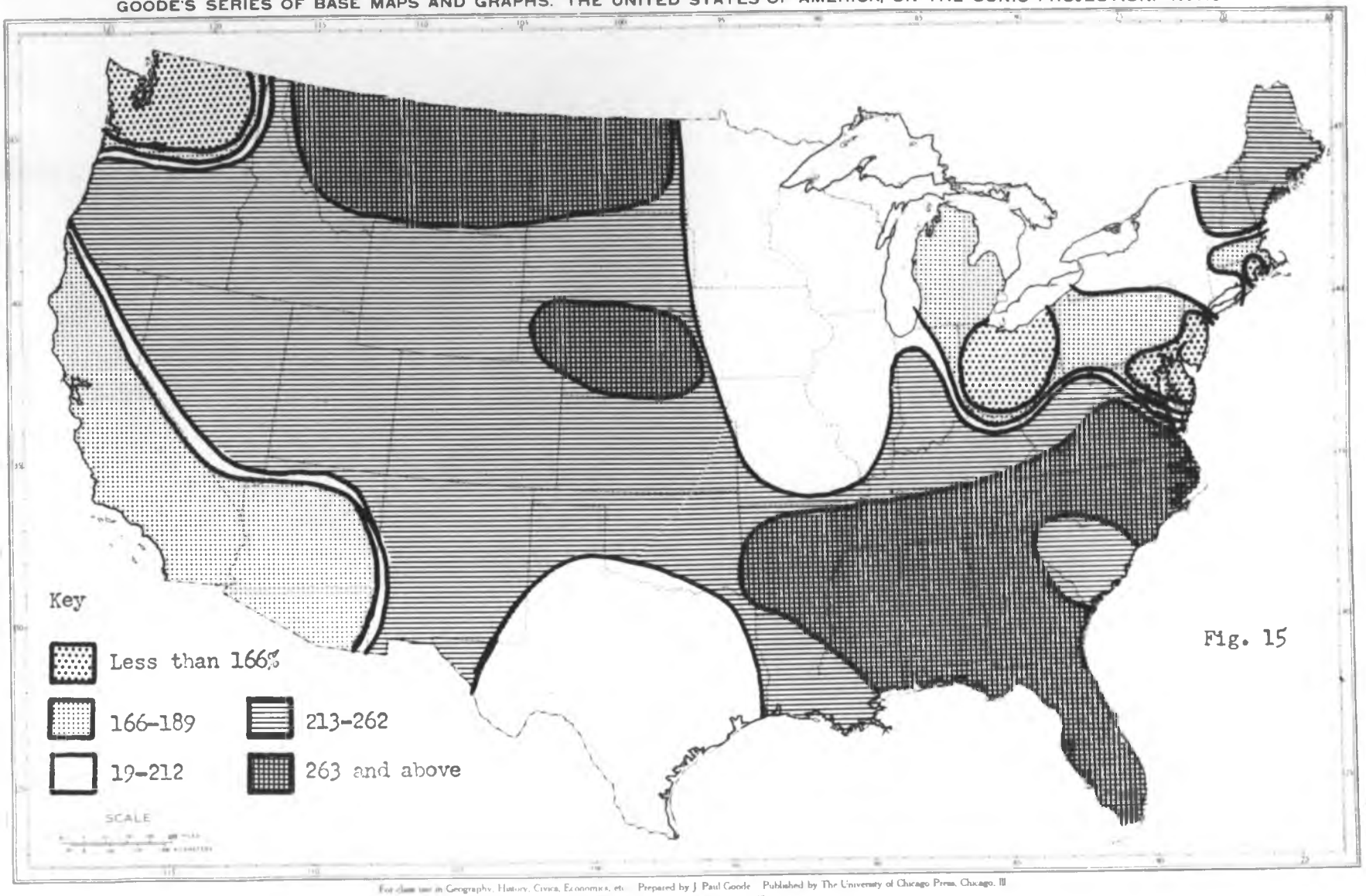


Fig. 15

Lack of clearcut regionality can be attributed partly to the disorganization that such a great change would bring to the market.

A comparison of production to change of production shows that the two patterns are inverse, one to the other. Half of the states are exactly inverse on the two maps with respect to their position relative to the average. Many other states have close correlation. This inverse correlation was put to a mathematical test. 1939 production was plotted against the trends in production between 1939 and 1948 on log-log graph paper (Fig. 16).[4] The distribution of points on this graph was close to that of a straight line which would indicate that production trends varied inversely as the square root of the 1939 per capita production. Thus the greatest increases in production occurred where production was the lowest and the variations in per capita production are tending to become smaller. This evening out of the market can largely be attributed to increased use of refrigeration equipment.

Estimates of the proportion of ice cream sold in packaged form were obtained for 28 marketing regions. This is only slightly more than half of the major marketing areas of the United States. The only pattern even approaching a grouping of characteristics is that in the northeast, in which less than half of the ice cream is sold in packaged form; and in the South generally more than half of the ice cream is sold in this way. The average of all areas is close to half in packaged form.[5]

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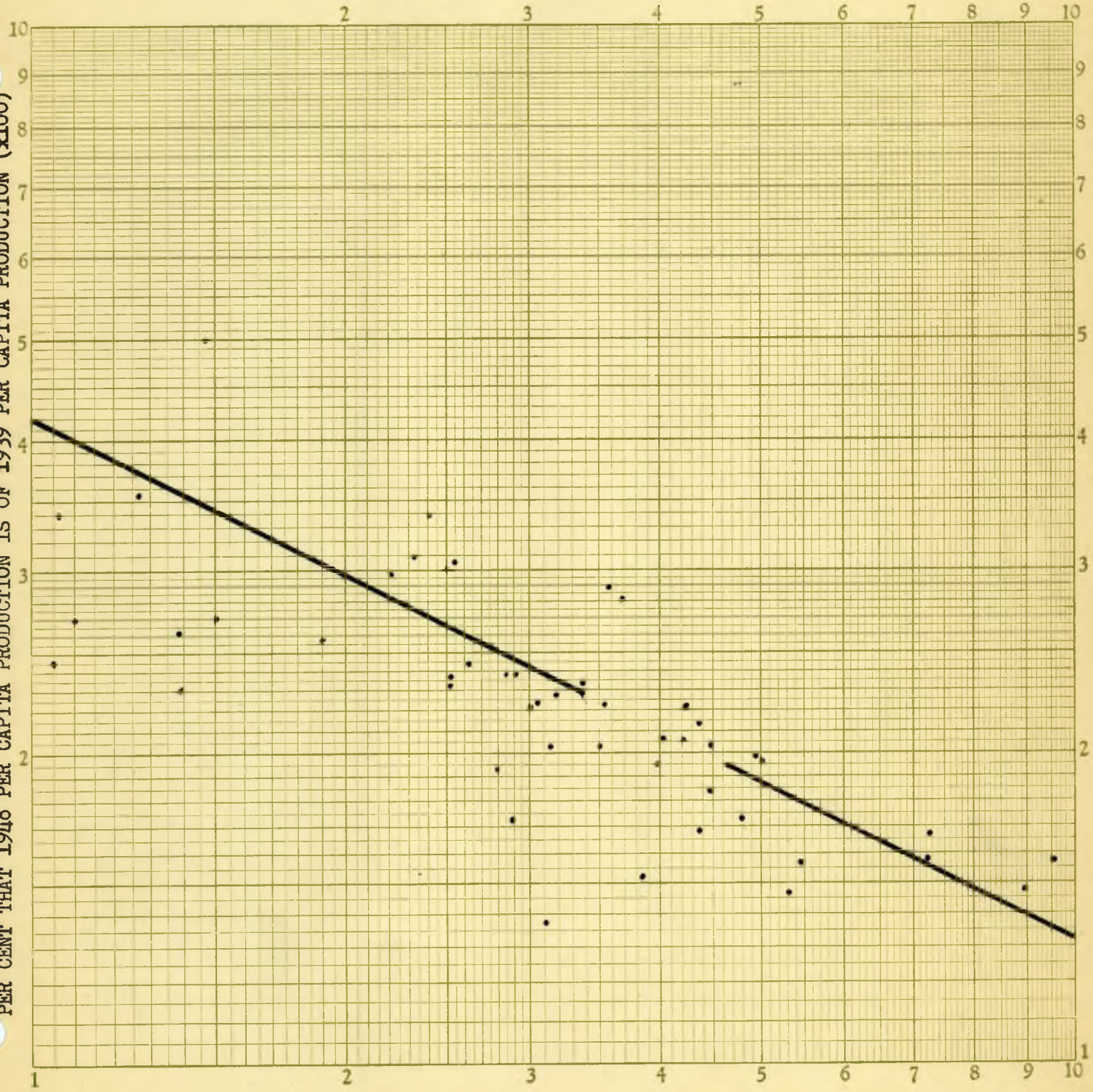
4. The mathematics of log-log graph paper are beyond the scope of this paper. The slope of a straight line on log-log graph paper is the power relationship between two variables.

5. Correspondence with the editor of the Ice Cream Trade Journal, a publication originating in New York City, brings out this point. He writes that pre-war sales of ice cream were only 36% in packages and novelties. An estimate for today would be closer to 50%. "The part which the open display cabinet is playing in this development is important. The addition of thousands of stores such as grocery stores and other 'dry stops'—those without fountains—is a notable factor as most of these stores sell on a self-serve basis and the open display cabinet is very important."

Fig. 16

GRAPHICAL COMPARISON OF 1939 ICE CREAM PRODUCTION AND THE PER CENT THAT 1948 PRODUCTION IS OF IT



The market for ice cream and the relation of this market to open display equipment are undergoing considerable change. The market for ice cream shows a certain amount of regionality. The Northeast is generally above average. The South is generally below or greatly below average. The West is generally average or below average. Ice cream production has doubled in the period studied. Greater increases have taken place where per capita production was smaller. Information on the proportion of ice cream sold in packaged form does not show any marked regionality. The proportion of ice cream sold in this manner is increasing. The increase in ice cream sales and the proportion sold in packaged form is closely tied to the increased use of open display refrigeration equipment. Open display equipment can be a great factor in these increases, and certainly these increases mean greater markets for open display equipment.

Dairy Products.

Despite the fact that it is a long established industry, very few mappable statistics can be obtained concerning the market for dairy products. Dairy products are marketed to a large extent at some distance from the point of production as for example, milk produced in Wisconsin and consumed in Tennessee.[6] Therefore, the statistics used in this section are fragmentary and consist of figures for various cities. Most information is in terms of milk only. There will be one map showing milk consumption per capita. This map shows the strength and weakness of the market for milk in terms of different areas. Information was also available on milk price differential and estimates for the proportion of dairy products sold wholesale. The milk price differential has great effect on the amount of milk sold through grocery stores, and the milk sold through stores could potentially be

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6. Loyal Durand Jr., Recent Market Orientations of the American Dairy Region, Economic Geography, January 1947, pages 32-40.

merchandised by open display equipment.

Most of the information used in this chapter came from The Milk Industry.[7] As well as figures given in the first source, estimates were obtained by correspondence from 33 cities for the proportion of dairy products sold wholesale.

The map used in this section is of milk consumption per capita in 1940 for 41 cities (Fig. 17). The average of these cities is 0.58 pints daily. The New York and Philadelphia areas are greatly above average. Boston, New Jersey, and Rochester in the East and Los Angeles, San Francisco, and Portland on the West Coast are above average. Only a few scattered cities are near average. These are Providence, Washington, Chicago, San Diego, and Sacramento. The remaining cities are below average. This includes several cities in New England, the Midwest, the South, and Arizona. Most of the cities in the southern half of the country are greatly below average. This includes Omaha and Cincinnati, but not Miami. Upper New England and many of the states of the South and West were not represented by any cities.

The fragmentary picture of milk consumption shows considerable regionality. The Northeast and the West Coast are generally above average, the Midwest is generally below average, and the South is greatly below average. This pattern is not unlike the other patterns of market developed in other parts of this paper. The distribution of milk price differentials and of the proportion of dairy products sold wholesale do not show any discernable regionality. This illustrates the fact that milk price differential, and consequently to a lesser degree the proportion of milk sold wholesale, changes from time to time and place to place with little relationship between one area and another, often due to local politics.

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7. Roland W. Bartlett, The Milk Industry, The Ronald Press Co., New York, 1946.

MILK PER CAPITA CONSUMPTION 1940
(Selected Cities)

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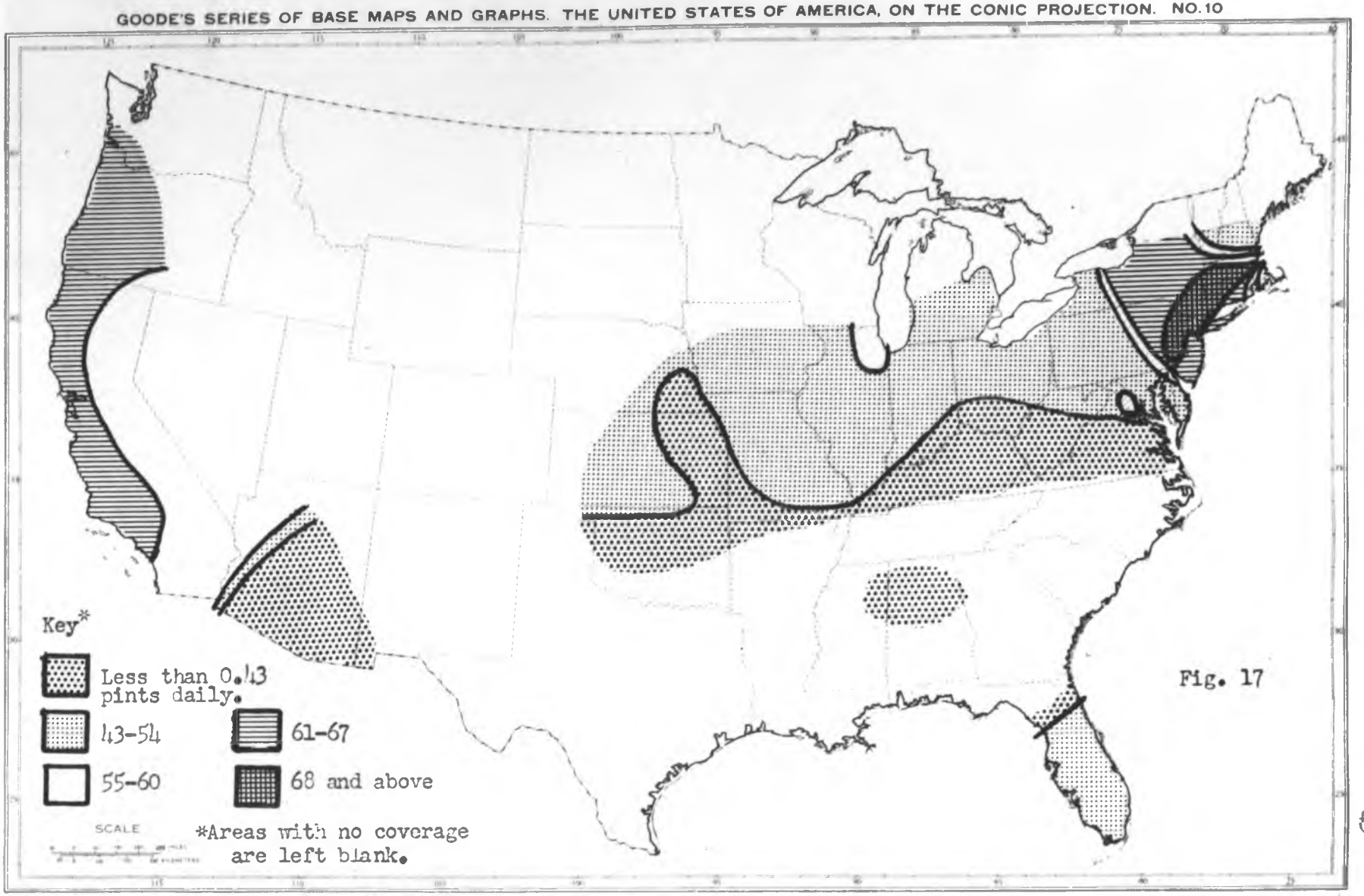

Fig. 17

Thus there must be no general relationship between these two maps and milk consumption (which shows regionality).

The different characteristics of milk sales can be analyzed mathematically to determine if there is any correlation between them. The Milk Industry has done some of this. Several correlations appear, but none of them is very strong. Where price differential is greater, consumption tends to be greater, and the proportion of wholesale sales also tends to be greater. The relation of consumption to wholesale sales is obscure, if there is any correlation. Milk consumption has increased slightly in the last few years. At the same time, there has been a trend toward increased sales of milk wholesale. In a number of cities analyzed, where price differential increased, so did both the total sales in stores and the total per capita sales. The opposite was true where the price differential decreased. This is probably due to the fact that when price differential is small or absent, the cost of delivery is included in the price of all milk and consequently, the price is higher. At the same time, milk delivery does not save any trips to the grocery store.

The picture of market for dairy products is much like that for ice cream. The information used, however, is fragmentary and some of it is unreliable. A general pattern of consumption is similar to the pattern for all refrigerated foods. The proportion of dairy products merchandised through stores is increasing. These sales could potentially be made through open display equipment. They are governed to some degree by milk price differential, which in turn shows no apparent regionality.

Frozen Foods.

The distribution of the market for frozen foods can not be accurately pictured by available information. This is because the frozen food industry is very new and is still undergoing rapid growth. This industry was first integrated

in 1937. Its ultimate position in the food market structure has not yet been determined. In this section a few remarks can be made about the frozen food market, the relation of that market to other foods, and the relation of frozen foods to open display equipment.

The market for frozen foods is not uniform. A study made in 1949 shows that about half of the rural population and two-thirds of the urban population use frozen foods, and that the proportion is increasing.[8] Farmers have less need for frozen foods because they can produce and freeze their own. The purchaser of frozen foods should have some freezer space in the home in which to keep it until it is to be served. Most refrigerators being made today contain such space. Thus, the distribution of refrigerators should have some influence on the market for frozen foods. An idea of the market distribution for frozen foods can be obtained from the distribution of freezer space. The Department of Agriculture gives statistics for the United States broken down into five regions.[9] The West Coast had 11% of the freezer space compared to 9% of the population. The West had 1% of the freezer space and 2% of the population, the Midwest 21% and 10%, the South 10% and 33%, and the Northeast 53% and 47%. Freezer space is not the same as market, but is the closest approximation available. This distribution shows strength in the West Coast, Midwest and Northeast states, and weakness in the South and West states. This pattern is not unlike the gross pattern for the other foods studied in this chapter.

Frozen foods are a new form of old foods and, therefore, must displace other forms of foods to establish a market. Frozen foods most nearly duplicate

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8. Frozen Food Yearbook, 1950, National Wholesale Frozen Food Distributors, Inc., New York City, page 39. 49% of the rural population used frozen fruits and 56% used frozen vegetables. 58% of the urban population used frozen fruits and 69% used vegetables.

9. U. S. Dept. of Agriculture, Marketing Frozen Foods -- Facilities and Methods, Washington, D. C., June 1949, page 66.

fresh foods. Correspondence with several food companies indicates that frozen foods have taken from about 5% to perhaps 25% of the market for corresponding fresh foods in various areas. Not sufficient information was received to establish any distributional qualities to these estimates. Frozen foods offer the equivalent to fresh foods when fresh foods are not available, yet strangely, frozen foods sell better when fresh foods are on the market. This is partly habit and partly that the presence of fresh foods causes people to think about them. Eventually, frozen foods will probably be supplemental to readily available fresh foods. As a measure of this, estimates of the proportion of the year that locally-produced fresh fruits and vegetables were available as a major part of the market were obtained in the same correspondence as above. As would be expected, this corresponds with climate. In the northern parts of the country, local production is available about three or four months of the year. In the central parts of the country, it is available five or six months. In the southernmost parts of the country, such production is available for more than six months. As a supplement to readily available fresh foods, frozen foods displace canned food more than they do expensive fresh foods. Frozen foods are not as easily kept as canned foods, but where facilities are available to keep them, they could eventually displace most of the market for canned foods. Other fields that frozen foods are entering are cooked foods and meats.

The open display cabinet is very important to the sale of frozen foods. About 56% of all frozen foods are distributed at the retail level.[10] All frozen foods sold at the retail level must be merchandised by refrigeration equipment, and open display is the only way that the customer will be able to see them. At present, the only important types of frozen foods merchandised in grocery stores

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10. Ibid, page 122.

are frozen fruits and vegetables. Therefore, the marketing of open display equipment will only be concerned with fruits and vegetables. This situation may change radically in the future. At the same time, the frozen food industry is suffering from growing pains and is not at present very important as an intermediate purchaser of refrigeration equipment. Thus, when the frozen food industry becomes an important factor in the sale of refrigeration equipment, the structure of its market may be greatly different than it is now.

The frozen food industry is new and in a great state of flux. Frozen foods are replacing other types of foods and have the same type of market distribution as other foods. Open display refrigeration equipment is very important to frozen foods. At present frozen foods do not have a great influence on the market of open display equipment, but will probably have a growing importance as the frozen food market becomes stablized.

Summary.

This chapter considered the products merchandized in open display equipment. The general picture of the market was considered first. This consisted of the total sales of refrigerated foods in grocery stores, which is that part of the sales of these products adaptable to open display merchandising. Each of the three major refrigerated foods were then taken up. Both the total market of these foods and the relation of this market to open display merchandising were presented by whatever information was available. In the case of ice cream, it was possible to show market trends. The company whose product is merchandized in open display equipment is a potential purchaser of this equipment or a potential intermediary for arranging sales between the grocery store and the manufacturer.

The amount of information available on the distribution of the total per capita market of each type of food was different for each case. The complete picture was available for ice cream, a fragmentary picture was available for dairy

products, and practically nothing was avilable for frozen foods. A comparison of these three markets shows that they all follow much the same pattern. The Northeast and the West Coast consistantly show up as above average. The South and West are always below average. The Midwest varies from average to above average. Parts of New England are sometimes below average. Individual states sometimes vary from this picture, such as Montana and Colorado which appear above average for per capita production of ice cream. No quantitative comparison of these markets can be made because of the inadequacy of most of the data.

Only part of the market for each type of product is adaptable to open display merchandising. In each case a different term was used for this part (packaged for ice cream, wholesale for milk and retail for frozen foods) in accordance with trade practice, but each term referred to the part which is marketed primarily through grocery stores. No regionality was discovered in the distribution of this division. Consequently, it is not surprising to see that the distribution of per capita sales of all refrigerated foods through grocery stores was very similar to the combination of the total market for each type of product. This general picture of market is more reliable than the information on the market for each type of product. Considerable regionality is shown. The Northeast and the West Coast were above average in sales per capita. The Midwest and the Southeast were average, the Plains states were below average, and the South was greatly below average in sales per capita.

Trends in the per capita production of ice cream are very revealing. Open display equipment is closely tied to increased ice cream sales. Therefore, changes in the market orientation of ice cream are very important to the market of open display equipment. In the period studied, a definite inverse relationship between size of per capita production and the change in relative production was

revealed. Mathematical analysis showed that this change varied as the inverse square root of production. This means that per capita production is tending to become uniform, but that the same general pattern of production is being maintained.

CHAPTER IV

The Market For Open Display Cold Storage Equipment

On the basis of the material presented in the foregoing chapters, an analysis of the market for open display cold storage equipment can be made. The bulk of the market factors taken up are concerned with the distribution of market potential, or the market possibilities on the basis of existing market factors. Some conclusions can be made about possible new markets. No information was available on the distribution of the total present market for open display equipment, so this market can not be analyzed. Hence, this chapter will summarize the findings of the foregoing chapters and will include a detailed evaluation of market, region by region. However, it should be remembered that much of the information used is pre-war and significant post-war changes may have been overlooked.

The market distribution for open display equipment can be described in terms of existing market factors. One factor is population, creating a market for the products merchandised in open display equipment. A second factor is the grocery store as the user of open display equipment. The final major factor in the market for this equipment is the producer of the products merchandised in it.

Population is the biggest factor in the distribution of market. Maps showing the density of some market factor are very similar to the map of population density for the same time and, when population changes, a corresponding change occurs in the market factors. Population is not the only factor, however. If other factors are shown with relation to population, then their areas of strength and weakness become more apparent. The total market is not in terms of population but its parts will be shown in terms of population. Therefore, a picture of population distribution needs to be given. There are heavy concentrations of population in the Northeast and in California. The remainder of the West Coast and all of

the country east of the Dakotas except Maine have average population density. The remaining part of the country, which is the West in general, has below average population density.

Although this paper has only been concerned with the grocery store as the user of open display equipment, there are other relatively unimportant users. Every grocery store is a potential user of open display equipment. Stores whose sales are very small are unlikely to buy special refrigeration equipment. These small stores have not been considered here. The amount of sales of refrigerated foods per store will affect its position as a potential customer for refrigeration equipment. Therefore, a composite map was drawn to include the distribution of grocery stores per 10,000 people and the part of their sales which were refrigerated commodities (Fig. 9). This map shows strength in New England, New York and the West Coast. The remaining part of the northern half of the country is average. The South is below average.

The producer of the products merchandised in open display equipment may purchase or arrange the purchase of this equipment. Even if all purchases were made by these producers, open display equipment would still be used in grocery stores. Therefore, the distribution of grocery stores remains paramount. The strength and weakness of the distribution of the producers of products merchandised in open display equipment can be given in terms of the distribution of their market. Different amounts of information were available on the distribution of the market for each kind of producer, but the information available indicated that there is no great deviation of any one of them from the total distribution of their markets. There also seems to be no regional qualities to the division of each market into parts sold through grocery stores and parts that are not. Consequently, the distribution of the total market for these products can be given as a reliable picture for all of them. The map of sales of refrigerated foods through

grocery stores per capita (Fig. 12) shows that New England, New York, and the West Coast and adjacent Northwest are above average. The states around the Great Lakes and the Southwest are average. The South and the Plains states are below average.

A combination of the factors described in the previous paragraphs would give the whole market for open display equipment. It is very difficult to combine these different characteristics without some reservations. The main difficulty arises from the fact that comparisons have to be made by states and characteristics are not uniform within the states, especially the larger ones. Thus, the per capita distribution of market strength is high in most of the Western states, but the population is concentrated in a few places and the total population density is small. A comparison of factors involved in the grocery store as the user of open display equipment was made (Fig. 10). This map is in effect a combination of the first two major factors discussed in this chapter, and is for practical purposes a map of grocery store density modified by the proportion of the store's sales which are refrigerated foods. A combination of this map and the map of refrigerated food sales per capita can be made so that grocery store density carries half the weight and the sales characteristics of refrigerated foods carries the other half. This second hald should be divided evenly between sales through grocery stores and sales per capita. The resulting picture shows the Northeast and the West Coast strong, upper New England, most of the Midwest, and the Northwest average, and the South, Plains states, and Southwest weak. This comparison does not merit more detailed treatment because it would tend to become misleading in greater detail. A more detailed treatment will be given when each area is taken up and analyzed.

Several references have been made to distribution within states in the main body of this paper. These references included prepared maps of population

distribution (Fig. 1), retail sales with reference to grocery store distribution (Fig. 2), and wholesale sales with reference to the intermediate buyers of open display equipment, the chain headquarters and the producer of refrigerated foods, (Fig. 11). These maps indicate that within the states there is a progressive concentration, as each map is considered, to the urban areas. There is also the indication that states with larger populations gain at the expense of states with smaller populations. The situation is actually a concentration to the center of the marketing areas which have no concern for state lines. The maker of open display equipment would like to make all of his sales to the intermediate buyer and, therefore, concentrate his sales in the larger urban areas. These sales would, nevertheless, be conditioned by the number of grocery stores and the sales of refrigerated foods within the area by grocery stores.

All of the maps used in this paper reveal geographic progression. In other words, states showing one characteristic are adjacent to states with characteristics of the next degree. Thus, there is a progression across the map from, for instance, greatly above average to above average to average, and so on. Another example is an isolated state with an extreme characteristic surrounded by states of the next degree. Seldom are two adjacent states widely different in characteristics. Therefore, if one state is a very good market, it should be expected that nearby states will be good markets, or conversely, a state which is a very poor market would be next to states that are poor markets and so on.

There are a number of tangible factors which can indicate new markets for open display equipment. One of these is increasing population. Another is growing per capita use of the products that are merchandised by open display. Open display equipment has only recently come into widespread use. It is sold as a replacement for other types of refrigeration equipment in many cases. Therefore, where population has increased in the recent past, there will be fewer worn out

pieces of other types of refrigeration equipment. This makes the population change figures at present available a little questionable as indicating good potential markets for open display equipment. Population change is described in chapter 2 (Figs. 3 and 4). Figures for the per capita change in production by states was only available for ice cream. This, however, is important since the ice cream industry is one of the most important intermediate buyers today. These figures indicated that in recent years, the greatest increases have taken place where the per capita sales were the lowest. This has been attributed to increased use of refrigeration equipment in areas where sales of refrigerated foods have been low. Thus, there is probably a double cause and effect relationship between refrigeration equipment, especially open display, and the sale of refrigerated foods. New markets for open display equipment can be looked for where sales of refrigerated foods are low, provided that these low sales are not due to inability to buy.

Rather than make a detailed composite map which would combine several different kinds of sales characteristics and would not necessarily be meaningful, a detailed evaluation will be made, region by region. Four characteristics will be considered for each area: population density (Fig. 1), population change (Fig. 4), the strength and weakness of the grocery store (Fig. 9), and the sales of refrigerated foods through grocery stores per capita (Fig. 12). Seven regions will be taken up: New England, the Middle Atlantic, the South, the Midwest, the Plains states, the West, and the West Coast.

New England will be the first region considered. New England consists of the six states, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. The northern three states, Maine, New Hampshire, and Vermont (Upper New England) are average or below average in population density, while the southern three are greatly above average. Population increase has been generally below

average. The position of grocery stores in New England is above average as is the sales per capita. New England is an area of above average market potential, but no improvement should be expected from its present position. The northern half is a poorer market than the southern half.

The second area to be considered is the Middle Atlantic. This consists of New York, Pennsylvania, New Jersey, Delaware, Maryland, and the District of Columbia. The latter three comprise the upper Chesapeake Bay area. In population density, the upper Chesapeake Bay area is above average and the northern three states are greatly above average. The upper Chesapeake Bay area has had above average population increase, New Jersey, average and the other two states had below average. The position of grocery stores and the sales per capita show a progression from high to low from the north to the south. The District of Columbia remains above average. Pennsylvania and Delaware in the middle are average. The Middle Atlantic varies from above average in New York to below average in Maryland, but shows a tendency to improve in the poorer areas. The District of Columbia at the south is consistantly above average.

The third area to be considered is the South. This includes Virginia, West Virginia, and Kentucky on the north, Texas and Oklahoma on the west, and all states to the south and east of them. The population density of the South is consistantly average. Only West Virginia (above average), Texas, and Oklahoma (below average) deviate from average. Population increase in the South has been greatly below average. Florida stands in contrast with above average increase. Virginia, Texas, and Oklahoma are above average. The position of grocery stores and the sales per capita in the South are either below average or greatly below average. Virginia, West Virginia, Florida, Texas, and Oklahoma are below average. The rest of the states are greatly below average. The one exception is Tennessee which is below average for grocery stores and greatly below for sales. In the South,

Florida and at least the eastern part of Texas can be considered average in market potential, with a tendency to improve. The rest of Texas, Louisiana, Oklahoma, Tennessee, West Virginia, and Virginia are below average. The remaining parts of the South are greatly below average. There is no indication at the present time that the South will change this position with respect to the rest of the country in the near future.

The fourth area to be considered is the Midwest. This includes Ohio, Missouri, Minnesota and the states in between. The eastern four states are above average in population density and the western four are average. Michigan had population increases above average, Ohio and Indiana average, and the remaining states had increases below average. The position for grocery stores in Indiana, Illinois, and Missouri is below average. In the rest of the states it is average. Indiana, Missouri, and Iowa have below average sales per capita. The rest of the states are average. The Midwest is generally average in market potential. Although Missouri is below average, Michigan shows signs of improving its position.

The fifth area to be considered is the Plains states. These are the Dakotas, Kansas, and Nebraska. The population density of the Dakotas is greatly below average, and that of Kansas and Nebraska is below average. North Dakota and Nebraska had population decreases, and the other two had increases below average. The position for grocery stores is below average in the Dakotas and average in Kansas and Nebraska. Sales per capita are greatly below average in North Dakota and below average in the other three states. The market potential for the Plains states is below average, and for North Dakota it is greatly below average.

The sixth area to be considered is the West. This consists of the eight remaining states which do not border on the West Coast. They are all greatly below average in population density. These states are characterized by population being concentrated in small areas, and vary among each other for the other char-

acteristics being considered. Nevada is consistantly greatly above average for all of them. Colorado is consistantly average. Population change varies from a decrease in Montana to greatly above average in Arizona, and is above average in Utah and average in New Mexico, Wyoming, and Idaho. This position of grocery stores is average in all except Montana where it is above average and in New Mexico where it is greatly below average. Sales per capita are above average in Montana, Idaho, and Wyoming, average in Utah and Arizona, and below average in New Mexico. In spite of the low population density, there seems no reason to place any of these states below average, except New Mexico. At the same time, none should be placed above average.

The seventh and final area to be considered is the West Coast. There are three states on the West Coast, California, Oregon and Washington. California and Washington have average population density and Oregon is below average. Like the states of the West, the population of these states is concentrated in parts of them. All three states had population increases greatly above average. All are above average in the position of the grocery store and greatly above average in sales per capita. California can truely be considered greatly above average in market potential and Oregon and Washington as above average.

CHAPTER V

Analysis of the Market of a Particular Company

As an application of the picture of market distribution developed in this thesis, an analysis will be made of the market of a particular company. This company is the R. H. Bishop Company of Champaign, Illinois, whose cooperation has been given in preparing this thesis. The market of this company will be described and evaluated. On the basis of the geographic variables of market discovered, recommendations will be made for possible new markets for this company.

The R. H. Bishop Company is located in east central Illinois (Fig. 18). Sales of open display cabinets were made in all parts of Illinois and Indiana in 1949. Considerable sales were also made in the nearby parts of all the adjacent states, Michigan, Wisconsin, Iowa, Missouri, Kentucky, and Ohio. Other states with large numbers of sales are California, New York, and the District of Columbia. Minnesota, Florida, and Texas also have important sales. A few sales were made in several other states. These include Idaho, Montana, North and South Dakota, Alabama, Georgia, Pennsylvania, New Jersey, Rhode Island, New Hampshire, and Maine. No sales were made in most of the Western and Southern states. A large part of the sales are in large groups in certain cities.

The best market for the R. H. Bishop Company has been the area within about 300 miles of the factory. Even within this area, many of the sales are grouped in the cities. Beyond 300 miles, the majority of sales are to certain cities, and the remainder are scattered widely. Groups of sales concentrated at particular spots indicate a good dealer in a city with a good market. The R. H. Bishop Company is small enough that sales made outside of the local area depend more on individual contacts and ability of certain dealers than on the general

DISTRIBUTION OF THE MARKET OF R. H. BISHOP COMPANY

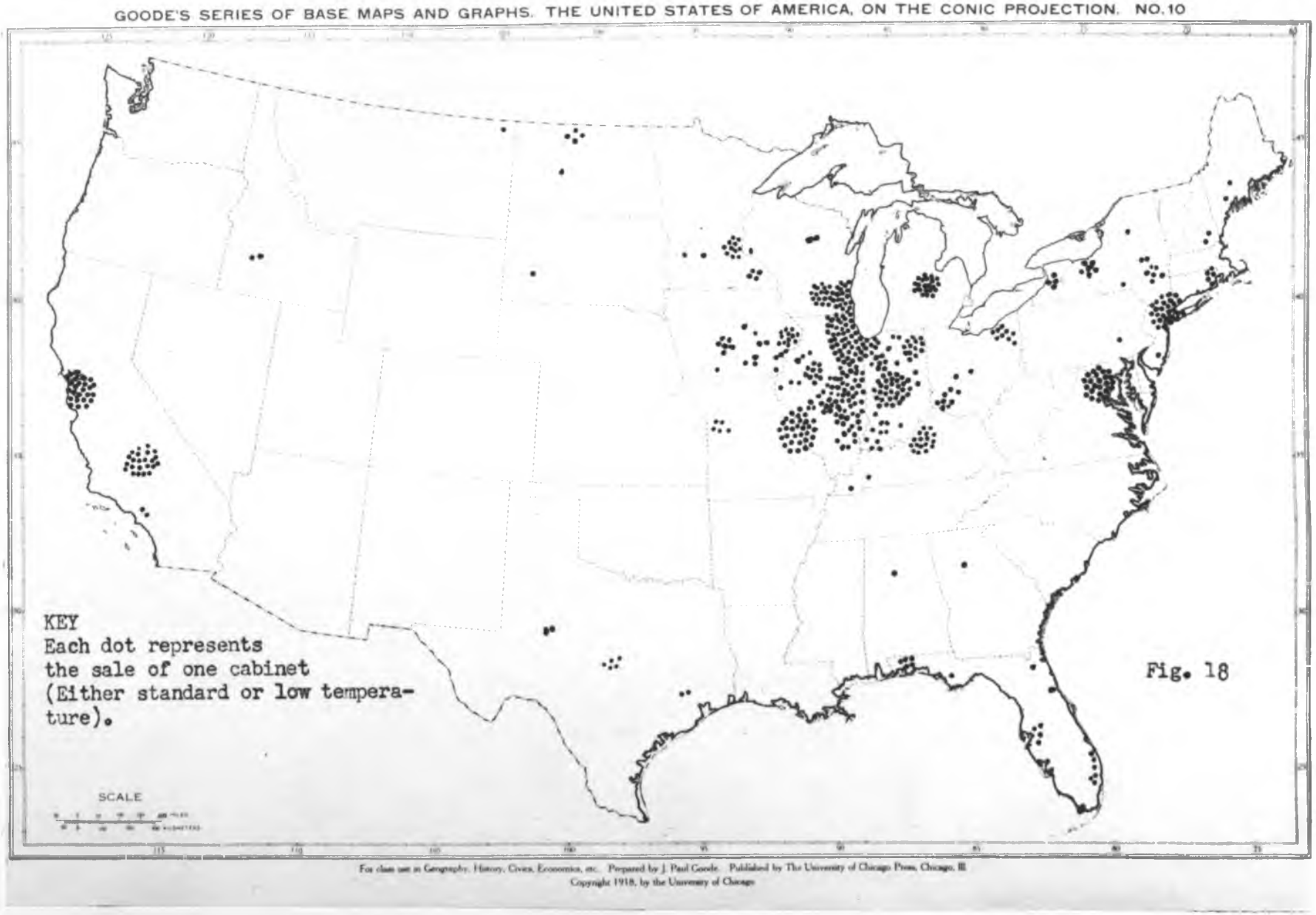

Fig. 18

market structure. Freight rates also make distant markets less desirable. Thus, only quantity shipments to distant areas are desirable.

Several recommendations can be made for the R. H. Bishop Company. The local market is already well covered. This should always be the best market. Strong outlets should be developed for New York, New England, and California. Other good distant markets are Florida, Texas, Oregon, and Washington. A greater market can probably be found in Pennsylvania and Ohio. Tennessee and some of the Western states, such as Colorado and Utah, might prove to have good sales possibilities. When considering markets at any distance from the factory, only the larger cities are good markets for this company. Sales should be in terms of a good dealer or to one of the producers of refrigerated foods. It might be well to spend considerable expense to secure a good dealer, because a great deal of money can be wasted trying out dealers who order only a few cabinets which then have to be serviced at a great distance. Many non-geographic conditions are involved in the market for open display equipment. These involve, for instance, personality and politics. The existing buying habits of an area are very important factors in potential sales, but no regionality was found for those that were investigated.

In conclusion it can be stated that there are significant geographic variables in the sales of open display cold storage equipment. Different variables tend to show similar patterns of distribution. A knowledge of geography can add a great deal to the understanding of marketing problems of open display cold storage equipment.

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APPENDIX

Table I.

Per Cent Population Change

State	1930-1950	1940-1950	State	1930-1950	1940-1950
Alabama	10.9	3.7	Nebraska	-6.7	-2.2
Arizona	78.0	55.8	Nevada	100.0	64.9
Arkansas	7.0	1.8	New Hampshire	20.4	6.6
California	90.4	58.8	New Jersey	22.6	19.0
Colorado	25.0	15.1	New Mexico	42.4	13.3
Connecticut	26.9	19.5	New York	15.4	1.8
Delaware	34.1	19.8	North Carolina	23.8	9.8
Dis. of Columbia	79.0	32.0	North Dakota	-8.6	-3.1
Florida	72.6	33.9	Ohio	21.8	17.2
Georgia	10.6	3.1	Oklahoma	-3.7	-1.2
Idaho	33.9	13.7	Oregon	90.0	66.4
Illinois	11.8	8.0	Pennsylvania	11.6	8.6
Indiana	25.2	18.3	Rhode Island	7.8	3.9
Iowa	7.6	5.0	South Carolina	15.9	6.1
Kansas	5.6	10.2	South Dakota	-2.0	5.6
Kentucky	11.7	2.7	Tennessee	25.1	12.4
Louisiana	26.5	12.6	Texas	31.3	19.2
Maine	15.0	8.2	Utah	36.0	25.7
Maryland	34.2	20.2	Vermont	3.6	3.8
Massachusetts	10.9	10.6	Virginia	29.6	17.2
Michigan	33.4	23.0	Washington	71.0	56.1
Minnesota	17.4	7.9	West Virginia	13.6	3.2
Mississippi	6.7	-1.8	Wisconsin	15.6	8.2
Missouri	9.3	6.8	Wyoming	25.3	12.9
Montana	-1.4	-5.4	U. S.	22.7	14.4

Calculated from official census population figures of 15th and 16th census and estimates for 1950 population.

TABLE II

The Grocery Store (1939)

A. Grocery stores per 10,000 people.
B. Sales of refrigerated foods per grocery store (dollars).
C. Per cent that refrigerated foods are of the total sales of grocery stores.
D. Sales of refrigerated foods by grocery store per capita (dollars).
E. Grocery stores per 1,000 square miles.

State	A	B	C	D	E
Alabama	3.38	3,260	6.3	1.16	18
Arizona	8.47	4,240	7.0	3.59	4
Arkansas	3.18	2,940	5.8	0.94	12
California	9.60	8,120	11.2	7.80	42
Colorado	8.43	4,580	7.9	4.08	9
Connecticut	10.90	5,290	9.4	5.77	375
Delaware	8.78	3,870	8.5	3.40	99
District of Columbia	10.67	7,750	10.0	8.27	10,110
Florida	6.80	4,140	6.8	2.86	22
Georgia	4.56	3,550	6.6	1.62	24
Idaho	8.67	5,300	8.5	4.57	5
Illinois	7.11	4,870	8.4	3.46	99
Indiana	7.01	3,860	7.2	2.71	66
Iowa	8.13	3,940	8.0	3.20	37
Kansas	8.17	3,540	7.1	2.89	18
Kentucky	4.61	3,330	6.3	1.53	32
Louisiana	3.42	3,380	6.4	1.15	17
Maine	12.64	3,800	8.1	4.81	32
Maryland	6.91	4,660	7.7	3.23	102
Massachusetts	9.98	5,130	8.9	5.12	521
Michigan	7.69	5,600	9.4	4.30	70
Minnesota	8.09	4,590	8.9	3.73	27
Mississippi	2.64	2,380	5.3	0.63	12
Missouri	6.87	3,530	6.7	2.43	38
Montana	10.22	6,140	9.3	6.30	4
Nebraska	8.02	3,850	7.2	3.09	14
Nevada	11.80	9,010	9.5	10.62	1
New Hampshire	14.52	3,870	7.8	5.62	77
New Jersey	8.55	5,420	11.1	4.64	433
New Mexico	4.54	4,790	6.5	2.18	2
New York	8.29	8,110	14.2	6.73	227
North Carolina	3.95	3,110	6.4	1.23	27
North Dakota	5.71	3,300	6.6	1.89	5
Ohio	9.00	4,480	8.1	4.03	152
Oklahoma	5.29	4,390	7.4	2.32	18
Oregon	10.49	6,170	10.1	6.49	12
Pennsylvania	7.37	5,560	9.3	4.10	162
Rhode Island	9.43	6,060	9.7	5.72	540

(Continued on page 61)

TABLE II (Con't.)

State	A	B	C	D	E
South Carolina	4.59	3,700	7.9	1.70	28
South Dakota	5.63	4,200	7.4	2.37	5
Tennessee	5.39	3,220	6.7	1.73	37
Texas	6.57	3,760	6.7	2.47	16
Utah	6.36	5,940	8.6	3.77	4
Vermont	11.60	3,750	7.7	4.36	44
Virginia	5.65	3,980	7.1	2.25	36
Washington	9.73	6,750	11.7	6.57	24
West Virginia	5.00	4,780	7.6	2.38	39
Wisconsin	9.07	4,580	9.4	4.15	51
Wyoming	8.40	5,670	7.8	5.24	2
United States	7.30	5,260	9.2	3.84	32

United States Department of Commerce: Retail Trade, Commodity Sales, Grocery and Combination Stores, Washington, D. C., 1941.

TABLE III

Ice Cream

A. Production, 1939 (gallons per person).
B. Production, 1948 (gallons per person).
C. Per cent that 1948 per capita production is of 1939 per capita production.
D. Proportion of ice cream sold in bulk (estimated per cent 1950).

State	A	B	C	City	D
Alabama	0.66	2.33	352	Albany	50
Arizona	1.44	2.47	171	Amarillo	53
Arkansas	0.55	1.49	269	Atlanta	55
California	2.17	3.67	169	Baltimore	60
Colorado	2.12	4.69	221	Charleston (W. Virginia)	30
Connecticut	1.76	3.56	202	Cleveland	50
Delaware	4.46	6.58	147	El Paso	55
District of Columbia	4.76	7.47	157	Grand Rapids	54
Florida	1.16	3.57	307	Houston	40
Georgia	0.75	2.03	270	Indianapolis	50
Idaho	1.46	3.45	236	Kansas City	47
Illinois	2.09	4.28	205	Knoxville	65
Indiana	2.17	4.65	214	Los Angeles	35
Iowa	2.23	4.54	203	Louisville	48
Kansas	1.52	3.40	224	Memphis	60
Kentucky	0.68	1.56	230	Milwaukee	50
Louisiana	0.97	2.49	256	Minneapolis	50
Maine	1.42	3.34	236	Nashville	40
Maryland	2.64	3.89	147	New Orleans	40
Massachusetts	2.39	4.12	173	New York	55
Michigan	2.22	4.06	183	Oklahoma City	35
Minnesota	2.50	4.91	196		50
Mississippi	0.53	1.78	338	Omaha	50
Missouri	2.00	4.12	206	Philadelphia	76
Montana	1.84	5.15	280		75
Nebraska	1.78	5.14	289	Phoenix	67
Nevada	1.27	3.87	304	Pittsburgh	52
New Hampshire	1.26	2.98	236	St. Louis	55
New Jersey	1.55	2.14	138	San Francisco	57
New Mexico	0.69	1.81	262	Savannah	20
New York	1.99	3.87	195	Spokane	25
North Carolina	0.73	3.64	500	Tampa	45
North Dakota	1.25	3.74	300		
Ohio	2.71	4.27	157		
Oklahoma	1.26	2.92	232		
Oregon	1.50	3.31	221		
Pennsylvania	3.62	6.07	168		
Rhode Island	3.60	5.69	158		

(Continued on page 63)

TABLE III (con't.)

State	A	B	C	City	D
South Carolina	0.52	1.29	246		
South Dakota	1.76	3.90	221		
Tennessee	1.20	4.04	338		
Texas	1.57	3.16	202		
Utah	1.68	3.93	234		
Vermont	1.58	3.62	228		
Virginia	1.10	3.28	297		
Washington	1.93	2.92	152		
West Virginia	1.32	3.20	244		
Wisconsin	2.46	4.90	199		
Wyoming	1.39	2.68	192		
United States	1.91	3.78	198		

TABLE IV

Milk

A. Per capita consumption 1940 (pints daily).
B. Price differential 1940 (cents, store - delivered).
C. Per cent sales of milk through stores 1940 (wholesale).
D. Per cent sales of dairy products wholesale (estimated 1950).

City	A	B	C	D	City	A	B	D
St. Louis	0.446	0.6	38.2	50	Lansing	0.504	0	
Pittsburgh	458	0	34.9	35	Lawrence	504	1.0	
Baltimore	~~402~~	0.6	45.5	31	Fall River	511	1.0	
Chicago	600	3.7	52.0	70	Buffalo	515	0.9	
Los Angeles	621	1.5	57.9	62	Toledo	528	1.0	
San Francisco	623	1.0	69.6	69	New Bedford	536	1.0	
Philadelphia	703	1.0	27.1	27	Sacramento	547	1.3	
Boston	718	1.0	32.0	40	San Diego	557	1.0	
New York	750	3.8	56.0	70	Washington	558	1.5	
Providence	592	1.0	17.0		Rochester	636	0.5	
Portland, O.	619	0	46.9		Connecticut	688	0.8	
New Jersey	624	1.0	29.5		New Orleans	294	2.0	70
Birmingham	303	1.0			Louisville	322	0.6	44
Kansas City, K.	309	0			Richmond	365	0	48
Tulsa	349	1.2			Phoenix	391	1.0	61
Omaha	411	0.9			Tucson	406		
Cincinnati	417	1.0			Kansas City, M.	454	1.0	55
Fort Wayne	427	0			Albany			50
Miami	492	0.5			Amarillo			77
Davenport	494	0			Charleston, W. Va.			60
Battle Creek	502	2.0			United States	583	1.2	50
Cleveland				50	El Paso			65
Grand Rapids				42	Houston			40
Indianapolis				85	Knoxville			50
Memphis				55	Milwaukee			50
Minneapolis				50	Nashville			50
Oklahoma City				65				45
Omaha				50	Savannah			83
Spokane				80	Tampa			60