A STUDY OF THE GROCERY CHAIN STORES OF LANSING, MICHIGAN, IN RELATION TO GROWTH IN NUMBER, GROWTH IN SALES, AND COMPARISON OF PRICES WITH THOSE OF INDEPENDENT GROCERY STORES

THESIS FOR THE DEGREE OF M. A.

Marguerite Rose Bosworth

1932

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A Thesis Submitted to the Faculty

of

Michigan State College

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Arts

Department of Home Management

Division of Home Economics

By

Marguerite Rose Bosworth

1932

THESIS

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INTRODUCTION

I. Importance of the Problem.

Thruout the United States the growth of chain stores during the last few years has been very rapid. Just how fast they have grown and whether the growth in sales has increased in proportion to the growth in number, are two much discussed economic questions.

Chain stores constitute a type of retailing business and as such affect consumers. Housewives are interested primarily in the effect the chain stores have on them and their purchasing. Do chain stores actually undersell individually owned stores and offer an appreciable saving? Daily purchasing of food suggests the value of a comparison of grocery chain store prices (with a consideration of quality) with those of independent grocery stores. The results should be of considerable benefit to housewives who are trying hard to cut down their grocery and meat bills and yet give their families food of good quality.

II. Objective.

The object of this study is to analyse the grocery chain store situation of a typical Midwestern industrial city in its relation to the consumer. Specifically it aims:

First, to indicate: (1) The growth in numbers.
(2) The growth in sales.
(3) A comparison of prices with those of independent grocery stores.

Second, to show: (1) The relation of growth in population to growth in number of chain stores.
(2) The relation of growth in sales to growth in number and to the total amount of money spent for foods in Lansing.
(3) Price variances as a possible reason for growth and consumer patronage.

Third, to discover whether the grocery chain stores are advantageous to the consumer in the matter of price.

Fourth, to compare these findings with those of surveys in other parts of the United States.

III. Review of Literature.

A. Chain Store Development.

Before proceeding with a discussion of chain store development it is well to take a moment to define the term "Chain Store". According to Converse, a chain of stores means a number of retail stores under a common ownership and management.[1] Darby defines a chain store as one of a number of stores either closely affiliated or under the same ownership.[2] Bloomfield uses a similar definition, a chain store organization is any group of retail outlets centrally owned and managed.[3] Again according to Nystrom, a chain store system is an organization composed of a number of retail stores operating under one management.[4]

As can be seen, all these authors avoid the mention of how many stores constitute a chain. The only reference to number was put forth by Darby in his reference to the preface of the chain store lists of the Kellogg Publishing Company from which he quotes "We put this question to a number of sales and advertising men, to

1. P.D.Converse, Elements of Marketing, p. 625
2. W.D.Darby, Story of the Chain Store, p. 9.
3. D. Bloomfield, Trends in retail Distribution, p. 222.
4. P.D.Nystrom, Economics of Retailing, p. 268.

chain store owners themselves, and to various other people interested in the chain store movement. The consensus of opinion seemed to be that no less than three stores could be considered a chain, and that three stores was at least the beginning of a chain." Probably the majority of chain store organizations included in the Kellogg lists consist of from three to six stores.[1] So the definition of a chain according to the number of stores is exceedingly elastic.

Likewise chains may be grouped according to goods handled, for example grocery chains, drug chains, and so forth; or as to location, local, regional, and national; or as to method of operation, personal salesmanship or self-service, cash-carry or service.

A chain store to a layman means usually a grocery chain store of the national or regional type involving the idea of cash and carry, but one must remember that chains also may be drug store chains, department store chains, and so forth, local as well as national; and give service instead of using the cash-carry system.

Assuming then that a chain store is one of a number of stores more or less controlled by the same individual or corporation and in any merchandise line, we

1. W.D.Darby, Story of the Chain Store, p. 9.

may say that the existence of the chain store system dates back to the very early history of storekeeping.

The chain store idea in distribution is at least 500 years old, if not older. In the 15th Century, the Fugger family of Augsburg owned and operated a system of merchandising houses scattered over a wide European territory, embodying the essentials of the chain store idea. In America itself in the 18th Century the Hudson Bay Company[1] maintained a series of trading banks similarly organized.

Our present day chain stores began with the Great Atlantic & Pacific Tea Company. Establishing itself as a single store about 1858, this organization is estimated to have a sales volume in excess of $500,000,000 annually, and to be operating between 15,000 and 20,000 stores. In 1900, its stores numbered about 200 and in 1921 about 4,500. In the forty years following the opening of the first Atlantic & Pacific store numerous other chains were launched: Jones Brothers Tea, 1872; Woolworth, 1879; Kroger, 1882;[2] James Butler Company in Brooklyn in 1882; the McCrory grocery chain in Scottdale, Pa., in 1882; S.S.Kresge, in Detroit in 1885;[3] and National Tea Company, in 1899.[4]

1. R.W.Lyons, The Economic Aspects of the Chain Stores, p. 1.
2. D. Bloomfield, Trends in Retail Distribution, p. 223.
3. P.D.Nystrom, Chain Stores, p. 3.
4. D.Bloomfield, Trends in Retail Distribution, p. 223.

The early rate of growth of these chains cannot even remotely compare with the progress that has been made since 1900, and particularly since 1915. The Atlantic & Pacific Tea Company as late as 1918 had a sales volume about one-fifth of its present estimated figure, with war prices in effect.[1]

Chains for the most part prospered during the war period, although the increase in the amount of their sales as measured in dollars was undoubtedly due in some measure to the rising price level of that period.[2]

The decade since the war has been characterized by a tremendous and unpredicted increase in the volume of chain store sales in scores of different lines of business. Let us look at the grocery chains. "Between 1919 and 1927 the sales volume of 27 grocery chains practically trebled. Atlantic and Pacific Tea Company sales approximately quadrupled. Kroger sales were multiplied approximately five times."[3]

Interestingly enough, net profits and sales per store have in at least a great many cases been maintained in the face of the rapid expansion in number of stores. From 1919-1927, Kroger suffered a slight decline in sales

1. D. Bloomfield, Trends in Retail Distribution, p. 334.
2. Ibid, p. 334.
3. Ibid, p. 335.

per store but practically maintained its net-profit-to-sales ratio (that is, the ratio of profits to sales remained approximately the same) at slightly less than three per cent thru 1927.[1] Atlantic and Pacific data are not available, but the net-profit ratio of this company is known to have remained practically constant.

An opposite viewpoint is held by O. Frederick Rost in his article on "Can the Chains Keep on Growing",[2] in which he includes the following discussion:

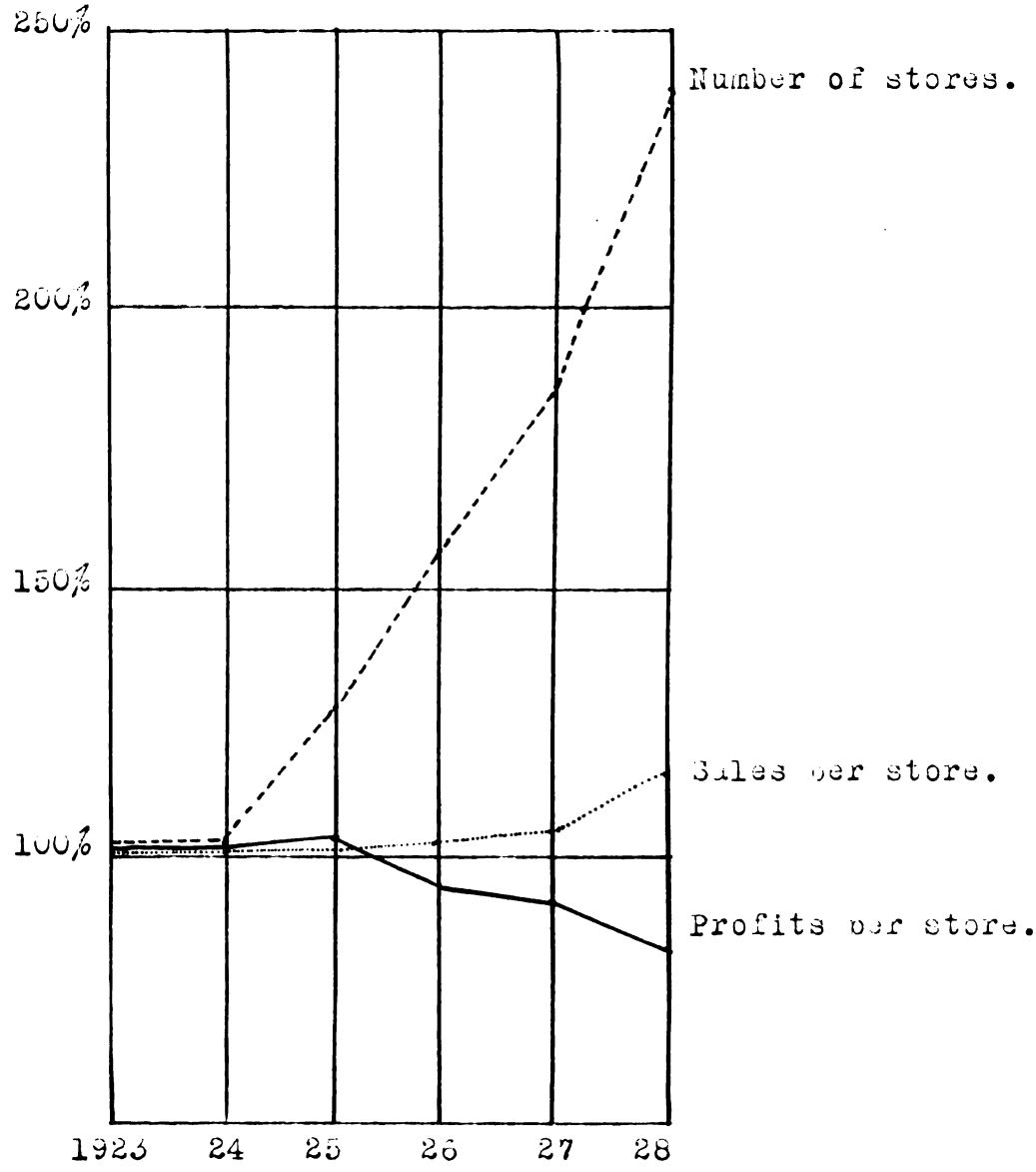
> It was in the grocery field that chain distribution first made its appearance. In that field it has undoubtedly achieved its greatest success. Hence it is there that we can best hope to find some of the most significant facts.....Profits from Grocery Chain Stores seem to come from their canneries, bakeries, and so fourth, where the Chain Store gets the producers', wholesalers', and retailers' profits. Profits do not seem to come from its retail stores.....Let us now analyse the performance of some of the grocery chains that have published authentic figures for the past five years. The annual statements of two prominent grocery chains show, as a matter of course, increased sales, and also dollar and cent increase in profits, yet actually they have in those five years and with an increase of more than 50 per cent in number of stores shown a decrease of nearly 20 per cent in the sales per store.
> .....
> Here the figures of three prominent grocery chains, covering the years 1923-1927 have

1. D. Bloomfield, Trends in Retail Distribution, p. 336.
2. O. F. Rost, "Can the Chains Keep on Growing", Nations Business, 17 (August 1929), 67.

been reduced to percentages. One glance at this chart gives the entire story.
(see chart on following page)
The three chains show an increase of nearly 150 per cent in number of stores against an increase of but slightly more than 10 per cent in sales per store and an actual decrease of 16 per cent in the profits per store.

From this study, chain stores seem to be barely holding their own in sales per store and actually losing in profits per store.

THE STORY OF THREE GROCERY CHAINS[1]



1. O.F.Rost, "Can the Chains Keep on Growing", Nations Business, 17 (August 1929), 67.

As to the present status of chain stores in the retail trade of the United States, there are now more than 10,000 chain store systems, counting all concerns with two or more units, with more than 100,000 retail outlets in the United States. In 1923, it was estimated that chain store volume of all kinds made up 6 per cent of the total trade of the country; 1926 - 8 per cent, 1927 - 12 per cent, and at the end of 1929 - 18 per cent.[1]

When we turn to an analysis of just the grocery chains, we find that they lead all others both in the number of chain units, and in total sales volume in the hands of chains. There are said to be over 900 grocery chains in the United States operating nearly 65,000 stores.[2] One estimate has been made to the effect that the chain store now controls 45 per cent of the total retail grocery business of the country.[3] A study made by the Curtis Publishing Company in 1926 in cities of over 10,000 population, revealed that about 1/3 of the grocery stores were chain owned.[4] And in several of our large cities the chains are doing from 50 per cent to 80 per cent of the grocery business.[5]

1. P.H.Nystrom, Chain Stores, p. 4.
2. Ibid, p. 4.
3. Annual of Chain Store Progress, (1928) p. 34.
4. Study by Curtis Publishing Company. 1926.
5. D.Bloomfield, Trends in Retail Distribution, p. 228.

Dr. Paul H. Nystrom, professor of Marketing at Columbia University states the following:[1]

> During the past ten years the retail volume passing through chain stores has been more than quadrupled and, unlike the department store sales trend, the largest part of the chain store gain has been made since 1921. Gains in chain store volume, however, were attributed to an increase in number of stores, rather than to increase im sales per store. In fact, it is understood that there is a policy of establishing new chain store units in the vicinity of the old ones as soon as the latter reach or pass a certain sales volume. This appears to be particularly true in the grocery field.

1. Quoted in "Chain Store Trends in 1928" - J. W. George Advertising and Selling, January 33, 1929.

According to the 1930 Distribution Census of the City of Lansing, grocery chains numbered 48 out of 163 stores, and had a volume of $2,904,016 in net sales out of a total of $6,225,240 net sales for all the stores. By calculating the per cent sales and per cent stores, we find that the chains did 46.6 per cent of the grocery business thru 29.4 per cent of the outlets. Table I gives these results along with the Distribution Census figures.

Table I. Grocery Stores in Lansing, Michigan; Number and Net Sales by Types.

	Number Stores	Net Sales	Per cent Stores	Per cent Sales
Single-store independents	102	$2,940,811	62.5%	47.2%
Local multi-units	13	380,413	7.9%	6.0%
Sectional and National Chains	48	2,904,016	29.4%	46.6%
Total	163	$6,225,240		

(Based on figures from the 1930 Distribution Census of Lansing, Michigan)

Together the local multi-units and the sectional and national chains did 52.6 per cent of the total grocery business thru only 37.3 per cent of the outlets.

The retail meat business of the country bids fair to fall into the hands of chains at even a more rapid rate than has the grocery business. In the short period of five years chains have taken over a very substantial part of this trade.

Kroger and Atlantic & Pacific stores have both entered this field on a large scale. Chains are undoubtedly doing at least 50 per cent of the meat business in certain centers, and as previously stated, some observers expect to see most of this business out of the hands of independents within a few years.[1] As a result most chain stores are food stores instead of just grocery stores, although they are still called grocery stores.

1. D. Bloomfield, Trends in Retail Distribution, p. 229.

B.Chain Store research work in other vicinities.

There have been four noteworthy attempts to compare the selling prices of independent and chain grocery stores.

R.S.Alexander published "A Study in Retail Grocery Prices" in the New York Journal of Commerce. He surveyed the prices of fifty articles in over a thousand stores in ten districts of New York City in 1929. Dr. Alexander selected only those articles which were absolutely standardized as to brand and quality. As these were limited to soaps, breakfast cereals, and beverages, they were not representative of all the goods in a grocery store. He found that Chains have an advantage of less than 3 per cent.[1]

Malcolm Taylor, Professor of Marketing of the University of North Carolina made a survey of grocery prices in Durham, North Carolina, a city of 48,000. He took sixty nationally advertised staples, branded and of a standard quality, and on December 10, 1929 visited and priced these articles in twenty-four chains and sixty-nine independently owned stores. The results of his study shows that the chain store prices were 13.79 per cent cheaper than prices in the independent groceries.[2]

1. R.S.Alexander, "A Study in Retail Grocery Prices", N.Y.J.of Commerce, 1929
2. M.D.Taylor, "Prices in Chain and Independent Grocery Stores in Durham, N.C." Harvard Business Review, July 1930,pp. 413-424.

Edgar Z. Palmer, associate professor of Economics of the University of Kentucky made a similar survey in Lexington, Kentucky, a city of 45,000. The articles selected in the survey numbered fifty-eight. They were chosen so as to be representative of the entire stock of goods, except meat, in an average grocery store. The survey included standardized and unstandardized products. He found that prices in chain stores on the average were 14.3 per cent lower than average prices in Independent Stores.[1]

Einar Bjorklund and James L. Palmer of the University of Chicago made a study of prices of 75 advertised brands of food secured from 309 independent merchants and from 4 chain systems in Chicago. The authors concluded that chains were underselling service independents by between 11 and 12 per cent on the items at regular prices.[2]

The average of the result of the four studies is approximately 10 per cent, or a saving of 10 cents on every dollar spent in chain stores.

1. E.Z.Palmer, "Finds chains in Lexington (Ky) 14.3% below Independents," N.Y.J. of Commerce, July 19, 1930, p. 11.
2. E.Bjorklund, and J.L.Palmer, "A Study of the Prices of Chain and Independent Grocers in Chicago," Univ. of Chicago, Studies in Bus. Admin. 1, No. 4 1930, 55

Two other studies were carried out in 1930 at Teachers College, Columbia. A Housekeeping group started with an empty kitchen, stocked it, prepared menues for a week, doing all the buying at a chain store. At the end of the week, the kitchen was re - emptied, stocked from an independent credit and delivery store, and the same menues prepared and fed to the same family the next week. Prices compared as follows - $17.33 at the chain and $21.49 at the independent store, a saving of $4.16 at the chain store, about 19.3 per cent. Three months later another study in a different section of the city with a smaller family and different menues, brought forth the following results - a total of $14.81 for the chain and $18.20 for the independent, a saving of $3.39 at the chain store, about 18.6 per cent.[1] In each case the family declared that the meals from the chain stores were as good as those from the independent store. This is, of course, not a scientific comparison of quality. Slight differences in the food used to prepare meals are not detected by a healthy family. These housekeeping groups were able to buy at the chain store food of good quality, sufficiently similar to that from the independent store to pass unnoticed by the families and to make a saving worth considering.

1. D.Monroe and L.M. Stratton, Food Buying and Our Markets, p. 108.

Because of several disputes concerning the alleged selling of underweight merchandise by the chain stores, the Columbus, Ohio, Better Business Bureau investigated 7 national chains, 3 local chains and 7 independent stores. Weighing was done by City Sealer on City Scales in presence of witnesses. Result - "Unable to discover at this time any selling practices followed by the national chain groceries in which the public is misused or defrauded in the purchased of Food Supplies."[1]

Also, the Independent Grocers Alliance of 9000 retailers made the following statement: - "So far as we have been able to ascertain, the large, reputable chain stores are not knowingly selling short weight merchandise."[2] Every manufacturer asked has denied that one weight or quality of nationally advertised goods is packed for independents and another for chains.[3]

Professor Malcolm D. Taylor also did a study of weights in chain and independent grocery stores in Durham, N.C., to ascertain to what extent, if at all, chain and independent grocers in Durham, N.C. were giving short

1. "City Grocers are Honest Report of Survey Shows," Chain Store Progress, Sept. 1930.
2. "Independent Grocers Alliance", Chain Store Progress, May 1930.
3. "Lists from Gold Dust, Van Camp, Minnesota Valley Canning Co. Chain Store Progress, May 1930.

weights on merchandise sold in bulk. As a subordinate part, several branded products were examined for differences in weight and quality of the contents. The report was based on 177 purchases from 21 stores, and included 73 bulk articles and 24 branded ones, The investigation was made on July 18,1930.[1]

In conclusion the author states:

> "That the Chain Stores of Durham are giving more accurate weights on bulk commodities than independents. The exact weight requested was given on 18 per cent of the purchases from Chain Stores and on none from Independents..... Thus so far as this investigation could determine, it is evident that blanket charges of dishonesty in weighing directed at either group as a whole are unjustified.....no evidence was found that would lead to the conclusion that special containers are being packed for Chain Stores".

Thus a comparison of prices on either unbranded or branded bulk or packaged goods should be perfectly legitimate.

1. M.D.Taylor, "A Study of Weights in Chain and Independent Grocery Stores in Durham, N.C.", Harvard Business Review, July 1931.

IV. Limitations of the Study.

The city of Lansing was chosen as the field of study for several reasons. It is a typical industrial city, located in the Middle West, where as yet no similar study has been undertaken; it was near at hand and the work could be done with facility.

Just the national and regional grocery stores of the cash-carry type were considered.

The only data available on growth in sales were obtained from the Kroger Grocery and Baking Company, thus this part of the study is typical of only one chain store, but may be suggestive of all.

The foods chosen for comparative purposes were limited to foods that are purchased most often. These were divided into 25 grocery items, 10 meats, and 15 fruits and vegetables, including 20 branded commodities and 30 unbranded. Twenty-five were probably identical in quality as well as size, while twenty-five had a quality variant. Each group will be considered separately.

PART I

GROWTH IN NUMBER OF CHAIN STORES IN LANSING

I. Procedure.

The figures on growth in number were obtained from Lansing city directories thru the courtesy of the Chamber of Commerce. Both the number of chain systems or units and the number of stores were taken covering the years 1920 thru 1931. For purposes of comparison local multi-units and independent stores were recorded as well as the national and regional chains. These were tabulated by years to show first the number of systems or units and the number of stores of the three types in operation at the beginning of each year, (see TableII); and second, the number of stores of each type and the per cent each was of the total (Table III.). Charts no. 1 and 2 picture these findings graphically.

In order to determine the relation of growth in number of chains stores to growth in population, the population of Metropolitan Lansing, which includes Lansing and East Lansing, was tabulated by years from 1920 thru 1930 (see Table IV). The Federal Census figures were used for 1920 and 1930, but the population between these years had to be estimated by first determining the constant annual rate of growth during the decade, using

the principle of geometric progression, and then applying this rate to the population, compounding it annually.[1] The estimated figures are given in Table III.[2]

The degree of relationship between growth in population and the growth in number of chain stores was found by calculating the coefficient of correlation and its probable error.[3]

1. R.E.Chaddock, Principles and Methods of Statistics, p. 126.
2. See Appendix for the logarithmic determination of the rates of growth.
3. See Appendix for the correlation table and computations.

Table II - Retail Grocery Store Growth in Number of Units and Number of Stores by Types - Lansing, Michigan, 1920-1931.

Year	National & Regional Chains		Local Multi-Units		Independents		Total Stores
	Units	Stores	Units	Stores	Units	Stores	
1920	2	3	3	6	150	150	159
21	2	3	2	4	162	162	169
22	3	5	3	6	159	159	170
23	3	11	7	14	170	170	195
24	3	10	3	6	182	182	198
1925	3	8	5	10	205	205	223
26	5	34	7	16	208	208	258
27	5	43	4	10	207	207	260
28	5	48	5	12	194	194	254
29	5	53	7	15	185	185	253
1930	4	56	7	16	179	179	251
1931	3	48	6	13	102	102	163

Table III.- Retail Grocery Store Growth in Number and in Percentage by Types - Lansing, Michigan, 1920-1931.

Year	Stores of Regional and National Chains		Stores of Local Multi-Units		Stores of Independents		Total
	Number	Per cent of Total	Number	Per cent of Total	Number	Per cent of Total	
1920	3	1.8	6	3.8	150	94.4	159
21	3	1.7	4	2.4	162	95.9	169
22	5	2.9	6	3.6	159	93.5	170
23	11	5.6	14	7.2	170	87.2	195
24	10	5.1	6	3.0	182	91.9	198
1925	8	3.6	10	4.4	205	92.0	223
26	34	13.2	16	6.2	208	80.6	258
27	43	16.5	10	3.8	207	79.7	260
28	48	18.8	12	4.7	194	76.5	254
29	53	20.9	15	5.9	185	73.2	253
1930	56	22.3	16	6.3	179	71.4	251
1931	48	29.6	13	7.9	102	62.5	163

CHART No. 1 - GROWTH IN NUMBER OF RETAIL GROCERY STORES, LANSING, MICHIGAN, 1920 - 1931.

CHART No. 2 - GROWTH (IN PERCENTAGE) OF RETAIL GROCERY STORES IN LANSING, MICHIGAN, 1920 - 1931.

Table IV - Growth in Population - Lansing, Michigan, 1920-1930.

Year	Lansing (Rate - 3.18%)	East Lansing (Rate - 13.92%)	Total (Rate - 3.528%)
1920*	57,327	1,189	58,516
21	59,149	1,354	60,581
22	61,029	1,542	62,718
23	62,969	1,757	64,931
24	64,971	2,001	67,222
1925	67,037	2,279	69,594
26	69,169	2,596	72,049
27	71,369	2,957	74,591
28	73,639	3,369	77,223
29	75,981	3,838	79,948
1930*	78,397	4,372	82,769

*Federal Census Figures

II. Findings.

The chain stores of Lansing in 1920 consisted of one store operated by the Grand Union Tea Company and two by the E.J.Pierce Groceries. During the ten years following, Piggly - Wiggly Stores, Thomas C. Stores, Naticnal Tea Co., R. Grocer Stores, Warner Stores, Atlantic and Pacific Tea Company, and Kroger Grocery and Baking Company stores were opened. At the present time the only existing chains in Lansing are the Atlantic and Pacific, Kroger and Warner stores. Some stores closed while others were taken over by the three chains still in existence; thus the total number of stores was not greatly affected altho the number of systems decreased.

In general, growth of chains in Lansing has been a growth not in the addition of new chain systems but the addition of new stores to the units or systems already established. In 1920 there were only 2 chain units with 3 stores, in 1926 5 units with 34 stores, and in 1930 4 units with 56 stores, a tremendous increase in number of stores. The local multi-units have not grown as rapidly. There are more units and less stores, for instance in 1926 there were 7 units with 16 stores. 1926 seems to be the peak year for the multi-units and independents, and shows the first marked expansion of the chain stores, their peak being in 1930.

The chain stores numbering only 3 in 1920 have grown to 56 in 1930; the local multi-units have grown from 6 to 16; and the independents from 150 to 179. It is evident that the chains have increased at the most rapid rate. Fluctuations show in each type, but the chain stores show a steadier increase than the other two with most rapid expansion since 1925. Independent stores have declined since 1926. All stores show a decided drop in 1931, due to the depression, it is believed.

Chains in 1920 were only 1.8% of the total number of retail stores, but in 1930 they had increased to 22.3%, and in 1931 to 29.4%, over 1/4, while the independent stores declined from 94.3% to 62.5%, now less than 2/3. Local multi-units are still in the minority, only 7.9% of the total.

Growth in population shows a positive correlation of .9 (r) ± .2 (P.E.[1]) with growth in chain stores, and may be interpreted as one reason for increase in chain stores. This is however far from being the only factor entering into a consideration of growth, as chains seem to have been developing much more rapidly than population. The population of Lansing increased 29.3% from 1920-1930, while chain stores increased 94.6%.

1. See Appendix.

One may conclude then that the chain grocery stores in Lansing have shown a tremendous growth in the addition of new stores to the units already established. The number of stores increased at a very rapid rate from 1925 to 1930. Their peak in numbers, seems to have been reached in 1930, although the chain store percentage of the total number of stores continued to increase in 1931. Independent grocery stores, however, are still in the majority, holding approximately 2/3 of the retail outlets while chains hold approximately 1/4, the balance being held by the local multi-units. Chain stores have increased in number while, proportionately, since 1925, independent stores have decreased. Population also has increased, but not at such a rapid rate as the chain stores. The fact that independent stores have decreased in number, while population has increased, leads to the conclusion, that chains grew in number partly to meet the needs of an increasing population. But, since the chain stores increased at a much more rapid rate than population, there must have been another factors at work. The writer feels that the expansion policies of the chain store organizations have had more to do with this increase than growth of population.

PART II

GROWTH IN SALES OF ONE CHAIN IN LANSING

I. Procedure.

As has been mentioned previously, the only data available on growth in sales were obtained from the statistical department of one of the national chains. Since this company first established stores in Lansing, in 1927, the data cover the years 1927, 1928, and 1929.

The figures were recorded by years to show sales in all the stores of this particular chain in Lansing, sales in the grocery departments, and sales in the meat departments, taking the stores in the order in which they were opened. (See Appendix Table XII) Each was totaled so as to show growth in sales and growth in number of stores, and per cent increase in the sales and in number over each previous year. The average sales per store were then calculated. (See Table V.) Results were presented graphically in charts No. 3 to 6.

The relation of the total amount of money spent for food in Lansing to the growth in sales of this one chain was determined by using figures from the 1930 Distribution Census of Lansing. These figures represent the total amount spent for all commodities and the total amount spent for food in 1929. As there were no comparable data for 1927 and 1928, figures had to be obtained by multiplying the population of those two years by the per capita amount spent for all commodities ($682) in 1929. These in turn were multiplied by the percentage spent for foods (17.76) to give the amounts for 1927 and 1928. From these results and a consideration of the sales in this one chain the per cent of Lansing "Food Money" spent in the one chain was found. Table VI. presents these figures covering the years 1927, 1928 and 1929, along with figures on the per cent the stores in this one chain were of all chains and the per cent they were of all grocery stores in Lansing.

Table V - Growth in Sales of One Chain in Lansing, Michigan, 1927, 1928, 1929.

	Total Sales (Dollars)	Per cent Increase over Previous Year	Number of Stores	Per cent Increase over Previous Year	Average Sales per Store	Per cent Increase over Previous Year
I. Sales in All Stores						
1927	131,658		6		21,943	
1928	535,542	306.76	26	333.33	20,598	6.13 d
1929	1,228,878	129.46	28	7.69	43,888	113.06
II. Sales in Grocery Depts.						
1927	131,658		6		21,943	
1928	474,524	260.42	26	333.33	18.251	16.82 d
1929	1,073,559	126.23	28	7.69	38,341	110.07
III. Sales in Meat Depts.						
1927						
1928	61,018		9		6,780	
1929	155,319	154.54	12		12,943	90.89

d = decrease

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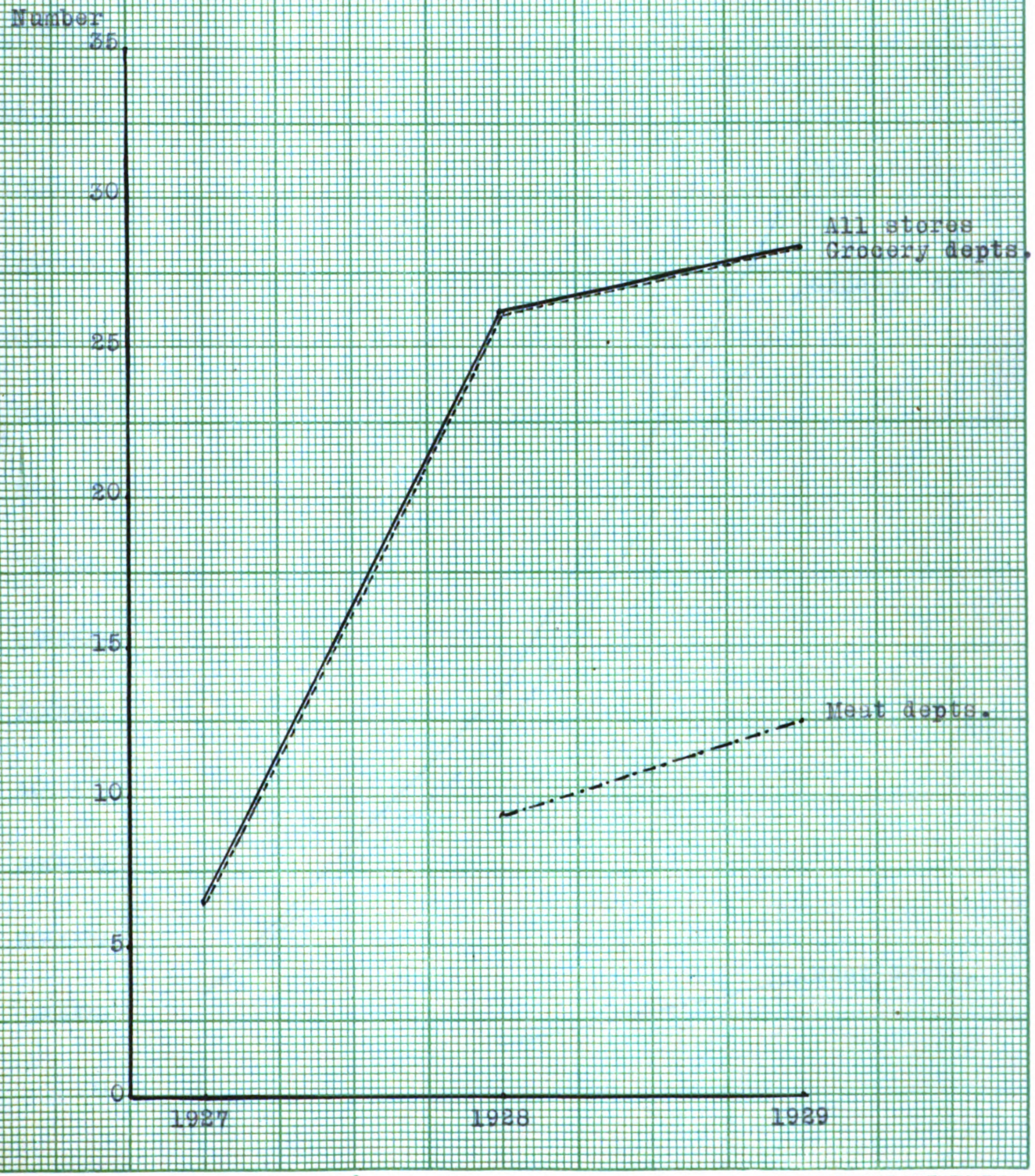
CHART NO. 3 - GROWTH IN THE NUMBER OF STORES IN ONE CHAIN IN LANSING, MICHIGAN, 1927 - 1930.



DEPARTMENT OF MATHEMATICS

CHART No. 4 - GROWTH IN SALES OF ONE CHAIN OF STORES IN LANSING, MICHIGAN, 1927 - 1930.

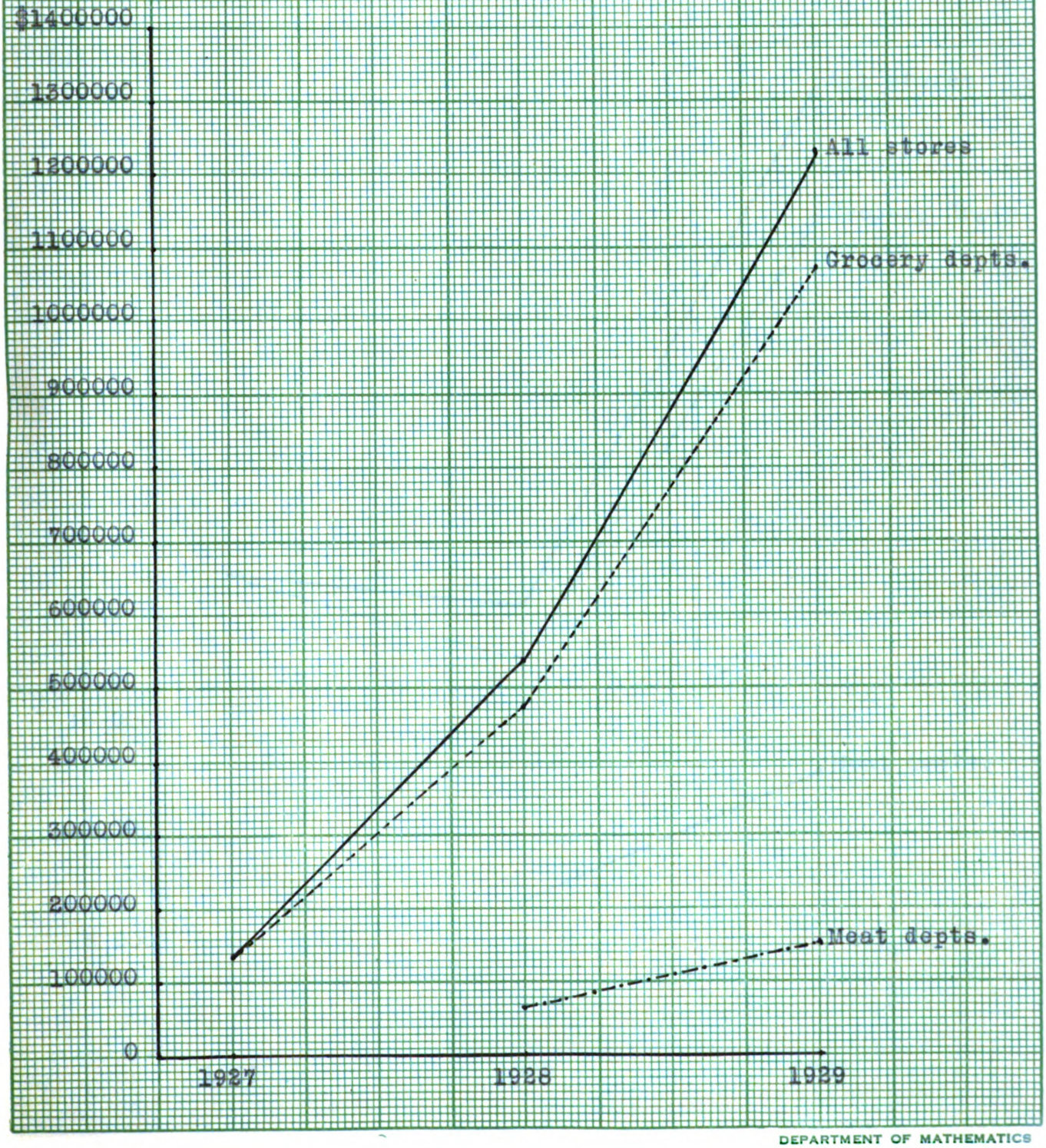


CHART No. 5 - GROWTH IN AVERAGE ANNUAL SALES OF CUT CHAIN IN LANSING, MICHIGAN, 1927 - 1930.

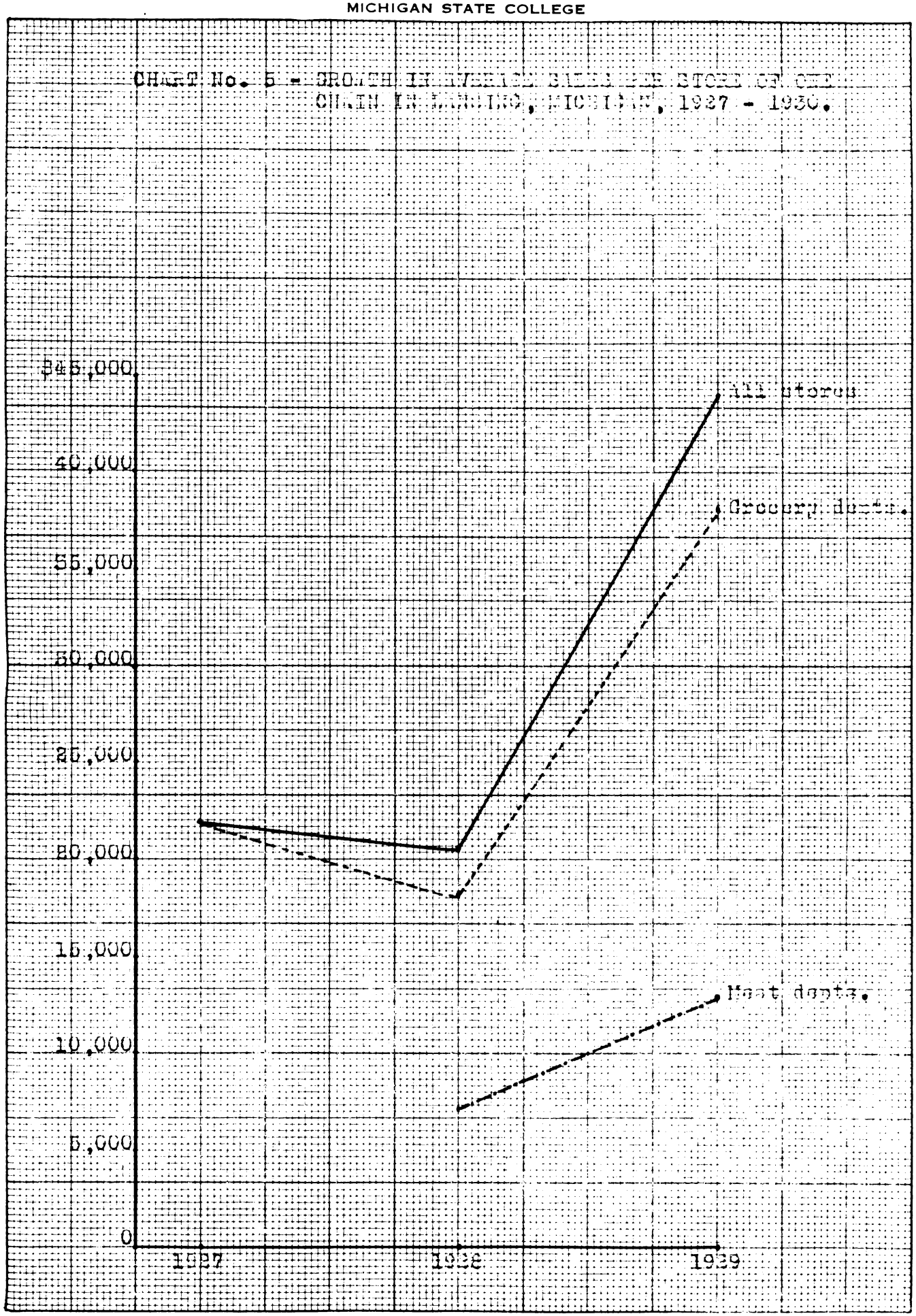


CHART No. 6 — PER CENT INCREASE OVER EACH PREVIOUS YEAR IN NUMBER, TOTAL SALES, AND AVERAGE SALES PER STORE OF ONE CHAIN IN LANSING, MICHIGAN, 1927 - 1930.

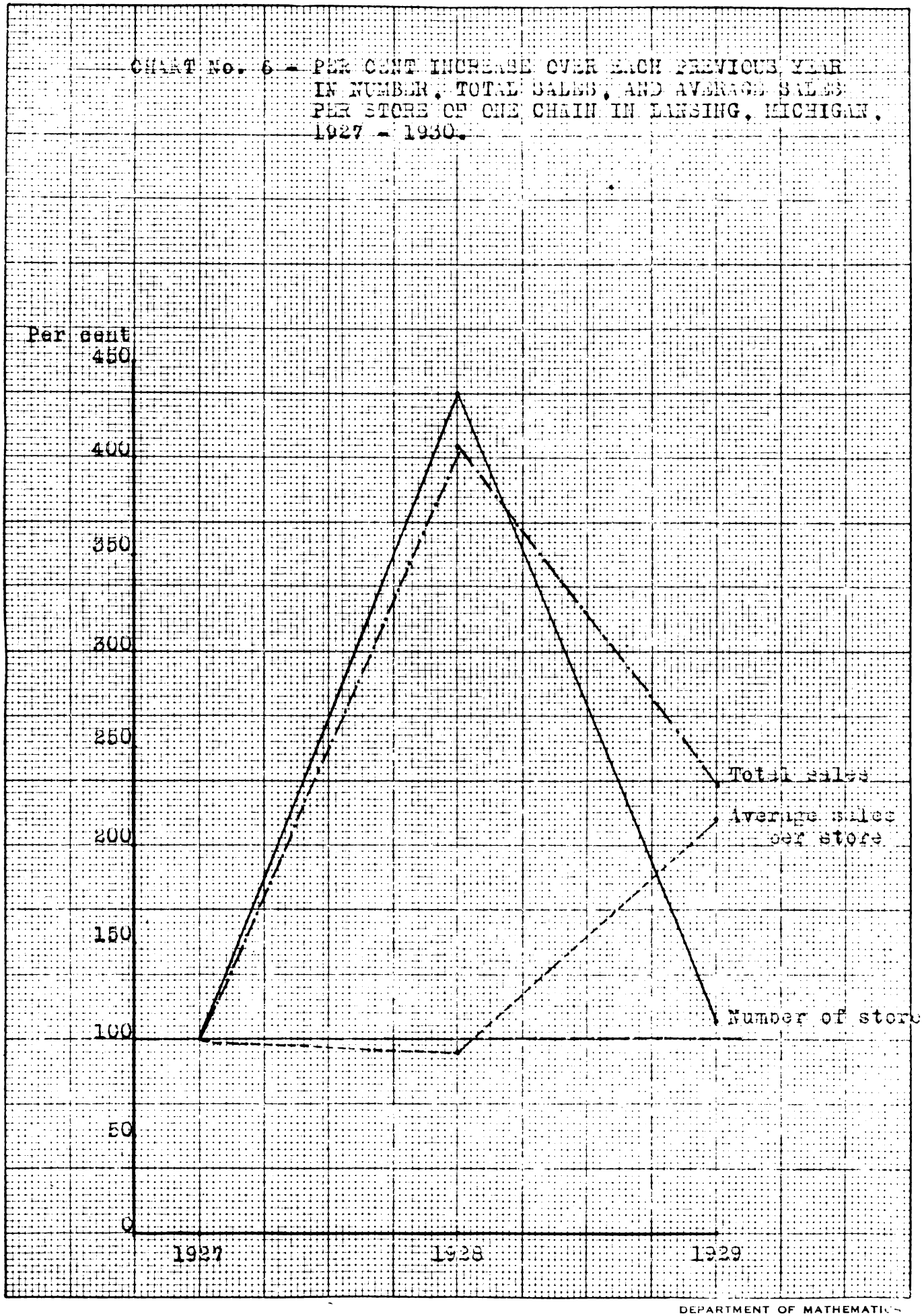


Table VI. - Relation of the Growth in Sales of One Chain to the Amount of Money Spent for Foods in Lansing, Michigan.

Items	1927	1928	1929
Population (metropolitan Lansing	74,591	77,223	79,948
Approximate amount spent on all Commodities in Lansing	$50,871,062	$52,666,086	$54,492,368
Amount Spent on Food	9,034,700	9,353,497	9,675,235
Sales in One Chain	$131,658	$535,542	$1,228,878
Per cent Lansing "Food Money" Spent in the One Chain	1.46%	5.72%	12.70%
Number Stores in the One Chain	6	26	28
Number of All Chains	43	48	53
Per cent the One Chain is of All Chains	13.95%	54.16%	52.83%
Number Stores in the One Chain	6	26	28
Number All Grocery Stores	260	254	253
Per cent the Stores in the One Chain are of all Grocery Stores, Lansing	2.31%	10.23%	11.06%

II. Findings.

Total Sales in all the stores in this one chain were found to be $131,658 in 1927, $535,542 in 1928 an increase of 306.76% over 1927, and $1,228,878 in 1929, and increase of 129.46% over 1928. Total sales in the grocery departments was $131,658 in 1927, $474,524 in 1928 an increase of 260.42% over 1927,and $1,073,559 in 1929, an increase of 126.23% over 1928. Total sales in the meat departments was $61,018 in 1928 and $155,319 in 1929, and increase of 154.54% over 1928.

The number of stores in the one chain increased from 6 in 1927 to 26 in 1928, and 28 in 1929. Meat departments grew from 9 in 1928 to 12 in 1929. The number of stores increased at a more rapid rate in 1928 than did sales, 333.33% as compared to 306.76%; but in 1929 increased only 7.69% as compared to an increase in sales of 129.46%.

Average sales per store were found to be $21,943 in 1927, $20,598 in 1928, a slight decrease of 6.13%, and $43,888 in 1929, a 113.06% increase. Grocery departments show a decrease of 16.82% in 1928 and an increase of 110.07% in 1929. Meat departments show an increase of 90.89% in 1929. Total sales increased more in 1929 than number of stores, thus sales per store also increased proportionately. (see Chart No. 6.)

The calculated amount spent on all commodities in Lansing was found to be $50,871,062 in 1927, $52,666,086 in 1928, and $54,492,368 in 1929, a gradual increase; the amount spent on food was $9,034,700 in 1927, $9,353,497 in 1928, and $9,675,235 in 1929, likewise a gradual increase. Sales in the chain increased much more rapidly, from $131,658 in 1927 to $1,228,878 in 1929. Thus the per cent of Lansing "Food Money" spent in the one chain was 1.46% in 1927 and 12.70% in 1929. Practically 1/8 of Lansing "Food Money", then, was spent in this one chain in 1929. Also the number of stores in this chain constituted more than 1/2 of all the chain grocery stores, which means then that 1/2 of the chain stores were getting 1/8 of all the Lansing money spent on food. Likewise in 1929, they were holding 1/9 of the retail outlets for food in Lansing and getting 1/8 of all the Lansing money spent on food. From these data one may conclude that these stores were getting slightly more trade proportionally than all the other retail grocery stores by 1929.

These findings show also that there has been a decided increase in sales in all the stores in this one chain in both the grocery and the meat departments. The growth in meat departments indicate the trend towards including meat departments in grocery stores. Growth in

sales has continued while growth in number has not. The number of the stores increased rapidly at first, then sales "took their leap." Average sales per store decreased in 1928 during the expansion in number of stores, but increased over 100% in 1929. Average sales in meat departments have almost kept pace with those in the grocery departments.

Since these stores were found to constitute 1/2 of the total number of grocery chains in 1929, the investigator feels that while these findings are typical of only one chain system of stores in Lansing, they may be suggestive of the trends in all.

PART III.

COMPARISON OF PRICES

IN CHAIN AND INDEPENDENT GROCERY STORES IN LANSING

I. Purpose.

The purpose of this price investigation was threefold: (1) to discover whether the Grocery Chain stores are advantageous to the consumer in the matter of price, and (2) to show price variances as a possible reason for growth and (3) to compare these results with those of surveys in other parts of the United States.

II. Procedure.

A. Choice of Articles.

The foods chosen for comparative purposes were limited to foods that are purchased most often by the average American housewife. These were divided into groups of ten meats, fifteen fruits and vegetables, and twenty-five grocery items. Of these, twenty were

branded, nationally advertised commodities and thirty were unbranded. Twenty-five were presumably identical in quality as well as size, while the other twenty-five had a quality variant. The choice of these articles was governed also by the following considerations: First, all goods chosen were sold in both the chain and the independent stores; and second, all the articles were found in a majority of the stores.

B. Choice of Stores.

Stores were chosen so as to cover both the primary and secondary shopping centers in Lansing. All the retail food stores along South Washington Avenue in "South" Lansing, on both South and North Washington Avenue in the main part of Lansing, on North Washington and Grand River in "North" Lansing, and all the stores in East Lansing, three stores in "West" Lansing, and six stores on East Michigan Avenue were visited. These totaled 19 independent and 9 chain

food stores (those having both grocery and meat departments), 7 independent and 3 chain grocery stores, 12 meat markets (independent), and 3 fruit and vegetable stores, a grand total of 41 independent and 12 chain stores. The chain stores represented were the Atlantic & Pacific Tea Company, Kroger Grocery and Baking Company, and Warner Stores.

C. Method of Investigation.

The survey was made on Thursday and Friday, November 12th and 13th, 1931. The first day was devoted to the list of 10 meats, and 15 fruits and vegetables; the second day to the 25 grocery items. The writer herself made the entire investigation, and every precaution was taken to insure accuracy. The prices were recorded on sheets typewritten for that purpose, and information was obtained in every store visited.

Returns were secured from a total of 53 stores, 12 of which were chain stores and 41 individually owned. There were 37 complete meat lists, 37 fruit and vegetable lists and 30 grocery lists, a total of 104.

The only items effected by "Sales" were specials on steaks in two of the chains. All other articles were regular prices.

D. Statistical Methods Used in Study.

Prices from the 104 questionnaire sheets were first listed by products on special recording sheets arranged so that source of every quotation was indicated by the number of the questionnaire from which it was taken. Meats, fruits and vegetables, and grocery items were listed separately for both independent and chain stores. (See Tables XIII thru XIX in Appendix). Next the data on these recording sheets were summarized. The average price of each product was calculated for both the chain and independent stores. Two forms of averages were used, the arithmetic or mean average and the model average. Unless half of the quotations were at a certain price, the model or common price was not recorded. The highest single price and the lowest

single price were included so that a comparison could be made of the relation the average price bore to the highest Price and also the difference in the range of the prices in both the chain and independent stores.

From the data on these recording sheets, a comparison sheet was worked out which shows for each product the average price, the common price, and the highest and lowest price in both the chain and independent stores. When the average showed a loss instead of a saving at the chain stores they were recorded as a minus item and subtracted from the total. The average amount saved at chain stores and the per cent saved at chain stores were also shown. (Table VII) These were then summarized to show the average per cent saved at chain stores on all meats, all fruits and vegetables, all grocery items, and on the total of all the foods recorded.

Table VII. - Comparison of

	Un	Highest Quoted Chain Cents)	Average Amount Price Differences at Chain Stores Cents	Per Cent
I. Meats Priced				
Round Steak	1 1	15-17	6.81	29.71
Sirloin Steak		15-19	8.14	32.37
Rib Roast of Be		17-25	1.83	8.05
Chuck Roast of		2-16	.97	6.53
Plate Beef		7-10	.80	7.72
Pork Chops (rib		5-19	3.38	16.23
Lamb Chops (rib		2-30	.51	2.05
Veal Chops (rib		-29	.76	3.37
Bacon, sliced		-25	.77	18.43
Ham, sliced		35	.97	3.15
(center smoked				
Totals (10 -tic				1
II. Fruits & Ve				
Oranges (Cal				
Bananas				
Grapes (Toka				
Lemons med.				
Grapefruit s				
" med Texa				
Lettuce (icebe				
Cabbage				
Squash (Hubba				
Turnip (White				
Tomatoes (Hot				
Cucumbers (Hot				
Celery				
Onions (Dry)				
Potatoes (Mich.)				
Totals (15 Artic				

Table VII - Continued

	Unit	Lowest & Highest Prices Quoted (Cents)	Chain	Average Amount Price Difference at Chain Stores	
		p.	ts)	Cents	Per Cent
III. Grocery Items					
Baking Powder, Rumford	12 o	30	23-25	.71	2.92
" " , Calumet	16 o	35	28-29	3.92	12.25
Beans, Navy		7	4- 5	.72	14.75
Bran Flakes, Kellogg		15	10-12	1.47	11.71
Butter, Creamery		2	29-34	.36	1.08
Cheese, American		5	19 only	6.05	24.15
Chocolate, Bakers		8	23 only	1.64	6.68
Coffee, Maxwell House		9	29-37	2.74	7.74
" , Delmonte		9	35-39	- .22	- .60
Corn Flakes, Kellogg		5	8-10	2.27	21.57
Corn Syrup, Karo		5		.91	6.74
" , Blue Label					
Cream of Wheat				.09	12.36
Crisco					8.00
Flour, Pillsburys					3.13
Gelatin, Knox					4.45
Grapenuts					56
Jello					
Lard, Snowdrift					
Peaches, Delmonte					
Pineapple, (sliced)					
" Libby's "					
Raisins, Delmonte					
Salt (box)					
Sugar (bulk)					8
Tomato Soup, Camp					31
Totals (25 Art					.26
IV. Summary					
Meats (10 articles					
Fruits & Veg. (15					127.61
Grocery Items (25					209.98
					226.26
Grand Total (50 A					563.85

III. Findings from the Study.

Table VII shows in summary form the data on which conclusions are based. When commodities were purchased at the chain stores, the average saving on meats was found to be 12.76%, on fruits and vegetables 13.99%, on grocery items 9.05%, and on all items 11.28%.

Objections may be made that these products were not weighted, that is, an item as Karo Corn Syrup, which some families may never purchase, was given as much weight as a staple commodity like sugar or butter. Professor Malcolm D. Taylor in his Comparison of the Chain and Independent Store Prices in Durham, North Carolina prepared a budget of the annual expenditutes for 20 articles representing 15 types of commodities which are included in the Bureau of Labor Statistics index of food prices. The weights which were used represented the annual consumption of each article by the average working man's family in the South Atlantic section of the United States, where his study was made. Agents of the Bureau visited 9,000 families in 51 cities in securing the data on quantities of each article consumed in the United States. The annual saving on the 20 commodities amounted to 12.55%.[1] This

1. M.D.Taylor, "Prices in Chain and Independent Grocery Stores in Durham, N.C." Harvard Bus. Rev. July 1930, pp. 413-424.

INSERT - page 48.

Objection may also be made that all of the meats and some of the fruits, vegetables, and grocery items were not identical in quality, and therefore not truly comparable in price. For this reason Table VIII was worked out to give in summary form the data on identical goods, while Table IX gives the results on goods with a quality variant.

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12.55%, the chain store saving on the 20 products, differs by only 1.24% from the saving of 13.79% on the 60 products priced in Professor Taylor's whole investigation. Thus the saving seems to be from 1 to 2 per cent less on this weighted list. (Insert)

The average price difference on identical fruits and vegetables was found to be 6.75%, and on identical grocery items 8.59%, and on total identical goods 8.22% which shows a smaller price difference than that on all items. For goods with a quality variant on meats the average price difference was 12.76%, on fruits and vegetables 17.62%, on grocery items 10.87%, and on all goods 14.32%. A greater price difference is seen on these goods than that on all items. The investigator found that beef included products from both steers and cows, and that the quality varied from choice to poor. The better quality meats were in most cases higher in price, while the poorer quality meats were cheaper. Generally speaking cow beef was found in the chain stores, but was of good quality. Fruits and vegetables appeared to be on the average much better in quality and less in price at the chain stores.

Table X gives a summary of the results of Tables VII, VIII, and IX. The average of all meats was 12.76%, of fruits and vegetables 12.78%, of grocery items

9.50%, and of all 11.27%. This gives practically the same price difference as that of the original unclassified list.

Referring to Table VII again, the greatest average price difference in meats was found in the purchase of sirloin steak, a 32.37% price difference and round steak, a 29.71% price difference , but it will be recalled that these were specially priced on the day of the survey. The least price difference in meats was found in lamb chops, 2.05%, and sliced ham, 3.15%,

The greatest average price difference in fruits and vegetables was found in tomatoes, 30.60%, and hubbard squash, 29.32%. The least price difference was found in lemons, 1.91%, and cucumbers, 8,28%; and a loss on grapefruit of 3.20% and on celery 1.22%.

The greatest average price difference in grocery items was found in American cheese 24.15% and Kellogg's Corn Flakes 21.57%. The least positive price difference was found in butter 1.08% and grapenuts 1.56%; and a negative price difference on Del Monte Peaches 2.04% and Del Monte Coffee 60%.

Similar model averages or common prices were found in both the chain and independent stores for eleven foods:-- plate beef, bananas, Tokay grapes, grapefruit, cabbage, white turnip, celery, butter, snowdrift, Del Monte peaches, and package salt.

The independent stores showed a greater per cent difference between the average prices and the highest prices, while the chain stores' highest prices were not much above the average prices. The range from the lowest to the highest prices was a great deal less in chain stores than in independent stores except in the case of Karo Syrup, Cream of Wheat and salt, and then only a difference of three cents or less.

Table VIII - Comparison of Prices on Identical Goods

	Average Price Difference at Chain Stores (cents)	Per cent Price Difference at Chain Stores (%)
I. Identical Fruits and vegetables		
Oranges (California Medium 216)	4.77	12.25
Grapes (Tokay	2.03	17.36
Lemons (Medium 300)	.82	1.91
Grapefruit (Small 80)	-.16	-3.20
Grapefruit (Medium 64)	.45	5.44
Totals (5 articles)		33.76

33.76% ÷ 5 = 6.75% Price Difference on Identical Fruits and vegetables.

II. Identical Grocery Items		
Baking Powder, Rumford	.71	2.92
Baking Powder, Calumet	3.92	12.25
Bran Flakes, Kellogg's	1.47	11.71
Chocolate, Bakers	1.64	6.68
Coffee, Maxwell House	2.74	7.74
Coffee, Del Monte	-.22	-.60
Corn Flakes, Kellogg's	2.27	21.57
Corn Syrup, Karo Blue Label	.91	6.74
Cream of Wheat	3.09	12.36
Crisco	2.00	8.00
Flour, Pillsbury's	2.50	3.13
Gelatin, Knox	3.38	14.45
Grapenuts	.27	1.56
Jello	1.14	11.72
Snowdrift	.45	1.80
Peaches, Del Monte	-.45	-2.04
Pineapple, " sliced	2.05	9.56
" Libby's "	3.90	17.80
Raisins, Del Monte	1.84	14.72
Tomato Soup, Campbell's	.97	9.81
Total (20 Articles)		171.88

171.88% ÷ 20 = 8.59% Price Difference Identical Grocery Items.

III. Summary

Identical Fruits and Vegetables	(5 articles)	33.76
Identical Grocery Items	(20 ")	171.88
Grand Total	(25 ")	205.64

205.64% ÷ 25 = 8.22% Price Difference All Identical Goods.

Table IX.- Comparison of Prices on Goods with a Quality Variant.

I. Meats with a Quality Variant	Average Price Difference at Chain Stores (cents)	Per cent Price Difference at Chain stores (%)
Round Steak	6.81	29.71
Sirloin	8.14	32.37
Rib Roast of Beef	1.83	8.05
Chuck Roast of Beef	.97	6.53
Plate Beef	.80	7.72
Pork Chops (rib)	3.38	16.23
Lamb Chops (rib)	.51	2.05
Veal Chops (rib)	.76	3.37
Bacon, sliced	4.77	18.43
Ham, sliced (center, smoked)	1.07	3.15
Total (10 articles)		127.61

127.61% ÷ 10 = 12.76% Price Difference Meats with a quality Variant

II. Fruits and Vegetables with a Quality Variant		
Bananas	1.47	18.08
Lettuce (Iceburg)	1.67	18.55
Cabbage	.62	26.16
Squash (Hubbard)	1.00	29.32
Turnip (White	.40	11.76
Tomatoes (Hot House)	7.54	30.60
Cucumbers (")	1.31	8.28
Celery	-.12	-1.22
Onions (Dry)	.64	16.84
Potatoes (Michigan)	2.30	17.85
Total (10 articles)		176.22

176.22% ÷ 10 = 17.62% Price Difference Fruits and Vegetables with a Quality Variant.

Table IX. - (Continued)

III. Grocery Items with a Quality Variant

Beans, Navy	.72	14.75
Butter, Creamery	.36	1.08
Cheese, American	6.05	24.15
Salt, Box	.44	4.42
Sugar, Bulk	.61	9.98
		54.38
Total (5 articles)		

54.38% ÷ 5 = 10.87% Price Difference Grocery Items with Quality Variant.

IV. Summary

Meats with a Quality Variant	(10 art.)	127.61
Fruits and Vegetables with a Quality Variant	(10 ")	176.22
Grocery Items with a Quality Variant	(5 ")	54.38
Grand Total	(25 articles)	358.21

358.21% ÷ 25 = 14.32% Price Difference All Goods with a Quality Variant.

Table X. Summary of Tables VII VIII and IX, on Comparison of Prices in Chain and Independent Stores.

	Per Cent Price Dif. at Chain store
I. All Meats Priced	12.76%
Identical Meats	------
Meats with a Quality Variant	12.76%
Average	12.76%
II. All Fruits and Vegetables Priced	13.99%
Identical Fruits and Vegetables	6.75%
Fruits and Vegetables with A Quality Variant	17.62%
Average	12.78%
III. All Grocery Items Priced	9.05%
Identical Grocery Items	8.59%
Grocery Items with a Quality Variant	10.87%
Average	9.50%
IV. All Goods Priced	11.28%
All Identical Goods Priced	8.22%
All Goods with a Quality Variant Priced	14.32%
Average	11.27%

IV. Findings from Other Price Studies in the United States.

Table XI gives in summary form the results of other price comparison studies made in the United States, arranged according to the date each survey was taken.

The results of these studies range from an average per cent price difference at the chain stores of 3 % to 19.3 %. The average of all the studies without including the Lansing one is 13.36%.

The Lansing study then shows a lower % price difference (11.28) than the average of all the other studies. And when the Lansing results are included with the other studies, the average of them all is 13.07%.

The Lansing Survey corresponds most closely to the Chicago, Illinois Survey, both ranging from 11-12% for the total goods priced. The Mid-Western studies show a smaller per cent price difference in Chain Stores than that of either the Eastern or the Southern Studies.

Table XI. Studies of Comparative Prices in Chain and Independent Stores in the United States.

Where Survey was taken	Type of Goods Priced	Date of Survey	Per Cent Price Difference at Chain Stores
New York, N.Y.[1]	Branded	1929	3.00%
Durham, N.C.[2]	Branded	1929	13.79%
Lexington, Ky.[3]	Standardized & unstandardized	1930	14.30%
Chicago, Ill.[4]	Branded	1930	11 - 12%
New York, N.Y.[5]	Branded & Unbranded	1930	19.30%
New York, N.Y.[6]	Branded & Unbranded	1930	18.30%
	Average of all previous studies - 13.36%		
Lansing, Mich.	Branded & Unbranded	1931	11.28%
	Identical Goods	8.22	
	Goods with a Quality Variant	14.32	
	Average of all studies to date - 13.07%		

1. R. S. Alexander, "A Study in Retail Grocery Prices". N.Y.J. of Commerce, 1929.
2. M. D. Taylor, "Prices in Chain and Independent Grocery Stores in Durham, N.C." Harvard Business Review, July 1930.
3. E. Z. Palmer, Finds Chains in Lexington (Ky.) 14.3% below Independents" N.Y. J. of Commerce, July 19, 1930, p.11
4. E. Bjorklund and J. L. Palmer, "A Study of the Prices of Chain and Independent Grocers in Chicago." University of Chicago, Studies in Bus. Admin. 1, No. 4, 1930, pp. 55.
5. D. Munroe and L. M. Stratton, Food Buying and Our Markets, p. 108.
6. Ibid, p. 109.

V. Conclusions.

From an analysis of Tables VII.-XI. the outstanding conclusion, that one can draw is that, in Lansing, Michigan, chain stores offer an appreciable saving to consumers. The consumer saves approximately 11¢ on every dollar spent in chain stores. For instance, if the grocery bill at an independent store was $50 a month, the bill for the same goods at a chain store would have been $44.42. The difference is less, however, on identical goods (only $8\frac{1}{4}$¢) and more on goods that varied in quality ($14\frac{1}{4}$¢), but regardless there is still a difference. The price difference on all groupings of goods priced ($11\frac{1}{4}$¢) is practically the same as that on the original unclassified list.

A second conclusion is the difference in prices between the chain and the independent stores may be a probable reason for their growth and greater consumer patronage. The consumer, getting more value for her money, has increased her purchasing in the chain stores.

The investigator found also that the Lansing study showed an average price difference (when purchases were made in the chain stores) comparable to those of other surveys in the United States and corresponding most closely to the Chicago study. The per cent price difference

in the Lansing study was slightly lower than the average of all the other studies.

SUMMARY

Since 1920, grocery chain stores in Lansing have grown considerably. This growth has not been an expansion in the addition of new chain systems, but in the addition of new stores to the units already established. The number of chain stores increased at a very rapid rate from 1925 to 1930. Independent stores on the other hand have decreased since 1926. All grocery stores show a decided drop in 1931 due to the depression, it is believed, but, although the number of chain stores decreased, as well as the other stores in 1931, the percentage of chain stores in relation to the total number of stores actually increased.

Growth in population was found to be one reason for growth in chain stores, but, since the chain stores increased at a much more rapid rate than population, there must have been other factors operating. The writer thinks that the expansion policies of the chain store organizations have had more influence on this increase than growth in population. Differences in prices between the chain and independent stores seem to be an even more probable reason for their

growth.

Statistics for 1927 thru 1929 from the one chain which controls more than ½ of the total number of grocery chain stores in Lansing, reveal a rapid growth in sales. The increase of meat departments in 1929 seems to indicate a trend towards including meat departments in its grocery stores. Growth in sales continued each year, while proportionately growth in number did not. Average sales per store decreased in 1928 during the expansion in number of stores, but increased over 100 per cent in 1929. Average sales in meat departments have almost kept pace with those in the grocery departments. These stores alone held 1/9 of the retail outlets and took in 1/8 of all the money spent in Lansing for food, from which we may conclude that they were getting slightly more trade proportionately than all the other retail grocery stores in 1929. Since these stores were found to constitute one-half of the total number of grocery chains in 1929, the investigator feels that while these findings are typical of only one chain system of stores in Lansing, they may be suggestive of the trends in all.

From the comparison of grocery chain store

prices with those of independent grocery stores, the outstanding conclusion that one may draw is that, in Lansing, Michigan, chain stores offer an appreciable saving to consumers. The consumer saves 11.28¢ on every dollar spent in chain stores. The price difference is less, however, in identical goods - only an 8½¢ - and more on goods that varied in quality - 14½¢. The price difference on all groupings of goods priced, 11.27¢, is practically the same as that on the original unclassified list. The investigator found also that the Lansing study showed an average price difference (when purbhases were made in the chain stores) comparable to those of other surveys in the United States and corresponding most closely to the Chicago study.[1] The per cent price difference in the Lansing study was slightly lower than the average of all the other studies.

Generally speaking, ~~then,~~ in Lansing, Michigan, independent grocery stores are still in the majority. They hold approximately 2/3 of the retail outlets while the grocery chains hold approximately 1/4. The balance is held by the local multi-units. The grocery chain

1. Bjorklund, E. and Palmer, J. L.: "A Study of the Prices of Chain and Independent Grocers in Chicago." Univ. of Chicago, Studies in Bus. Admin. 1, No. 4 1930, pp. 55.

stores are, however, tending towards displacement of the independent grocery stores. Lower prices in goods of comparable quality seem to be the most outstanding reason for their growth and consumer patronage.

ACKNOWLEDGMENTS

The writer wishes to express her sincere appreciation to the following groups and individuals whose co-operation made this study possible:

The fifty-three retailers, chain and independent, who willingly supplied the desired price information.

The Kroger Grocery and Baking Company for its statistical material on growth in sales.

The Lansing Chamber of Commerce who afforded help in the gathering of material on growth in number of chain stores.

and -

Dr. Irma H. Gross for her painstaking reviews and many helpful suggestions during the planning and progress of this study.

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Footnote:

Direct reference has not been made in the body of the thesis to some of the books, pamphlets of articles listed here, because they have been used only indirectly at various places and have not been quoted.

APPENDIX

Logarithmic Determination of the Constant Annual Rates of Growth of the Population of Lansing, Michigan, During the Decade of 1920 to 1930

Lansing

$$\log (1+r) = \frac{\log 78{,}397 - 57{,}327}{10}$$

$$= \frac{.89429944 - .75835922}{10}$$

$$= .013594022$$

$$1+r = 1.03179$$

$$r = .03179 \text{ or } 3.179\% \quad \text{(use } 3.18\%\text{)}$$

East Lansing

$$\log (1+r) = \frac{\log 4{,}372 - \log 1{,}189}{10}$$

$$= \frac{.64068015 - .07518185}{10}$$

$$= .056549830$$

$$1+r = 1.13917$$

$$r = .13917 \text{ or } 13.917\% \text{ (use } 13.92\%\text{)}$$

Total

$$\log (1+r) = \frac{\log 82{,}769 - 58{,}516}{10}$$

$$= \frac{.91786771 - .76727463}{10}$$

$$= .015059308$$

$$1+r = 1.03528$$

$$r = .03528 \text{ or } 3.528\% \quad \text{(use } 3.528\%\text{)}$$

(See R. E. Chaddock, *Principles and Methods of Statistics*, p. 126.)

CORRELATION TABLE AND COMPUTATIONS OF THE COEFFICIENT OF CORRELATION AND ITS PROBABLE ERROR.

Correlation of the Population of Lansing, Michigan (Y) to Growth in Number (X) of Grocery Chain Stores.

Year	X	Y	x	y	xy	x^2	y^2
1920	3	58516	-21.9	-11497.8	251801.82	479.61	132199404.84
21	3	60581	-21.9	- 9432.8	206578.32	479.61	88977715.84
22	5	62718	-19.9	- 7295.8	145186.42	396.01	53228697.64
23	11	64931	-13.9	- 5082.8	70650.92	193.21	25834855.84
24	10	67222	-14.9	- 2791.8	41597.82	222.01	7794147.24
1925	8	69594	-16.9	- 419.8	7094.62	285.61	176232.04
26	34	72049	9.1	2035.2	18520.32	82.81	4142039.04
27	43	74591	18.1	4577.2	82847.32	327.61	20950759.84
28	48	77223	23.1	7209.2	166532.52	533.61	51972564.64
29	53	79948	28.1	9934.2	279151.02	789.61	98688329.64
1930	56	82769	31.1	12755.2	396686.72	967.21	162695127.04
	274	770152					
	24.9 (M_x)	70013.8 (M_y)			1666647.82 $\Sigma xy'$	4756.91 $\Sigma x^2'$	646659873.64 $\Sigma y^2'$

$\sigma_x = \sqrt{\frac{\Sigma x^2}{n}}$ $\sigma_y = \sqrt{\frac{\Sigma y^2}{n}}$

$= \sqrt{\frac{4756.91}{11}}$ $= \sqrt{\frac{646659873.64}{11}}$

$= \sqrt{432.4407}$ $= \sqrt{58787261.24}$

$\sigma_x = 20.79$ $\sigma_y = 7667.2$

$r = \frac{\Sigma xy}{n \sigma_x \sigma_y}$

$= \frac{1666647.82}{11(20.79)(7667.2)}$

$= \frac{1666647.82}{175341.1968}$

$= .9505169$

$P.E._r = .6745\left(\frac{1-r^2}{\sqrt{n}}\right)$

$= .6745\left(\frac{1-.90345}{\sqrt{11}}\right)$

$= .6745\left(\frac{.09655}{3.31}\right)$

$= .6745(.029169)$

$P.E._r = .19674$

$\therefore r \pm P.E._r = .9 \pm .2$

Table XII. -

Stor In Order of D	Sales in Meats Department 1927	1928	1929
1	------	3,860	540
2	------	------	731
3	------	12,835	22,067
4	------	------	------
5	------	999	20,583
6	------	888	20,589
7	------	---	395
8	------	094	24,529
9	------	---	------
10	------	893	16,528
11	------	---	------
12	------	---	------
13	------	---	
14	------		
15	------		
16	------		
17	------		

Total Sal
Number of
Average Sa

Table XIII.

Questionnair	Veal Chops	Bacon Sliced	Ham Sliced
1	.22	.18	.35
2	.19	.25	.35
4		.25	.35
8		.30	.38
10		.30	.45
12		.25	.22
14		.25	.38
16		.20	.22
18		.20	.22
19		.25	.50
21			.45
23			.22
24			.35
28			
4			
42			
44			
45			
46			
48			
49			
53			
54			
56			
Mean (Ave.			
Mode (Most			
Price			
Lowest Price			
Highest Price			

Table XIV. - (

Questionnaire	Veal Chops	Bacon Sliced	Ham Sliced
61	.22	.20	.35
63	.29	.25	.29
6F	18	.20	.25
6	25	.20	.35
6	25	.23	.25
7	19	.23	.29
7	20	.20	.34
7	16	.20	.25
7	22	19	.29
Mean (Ave		1	.3288
Mode (Mos			

Lowe			.25
High			.35

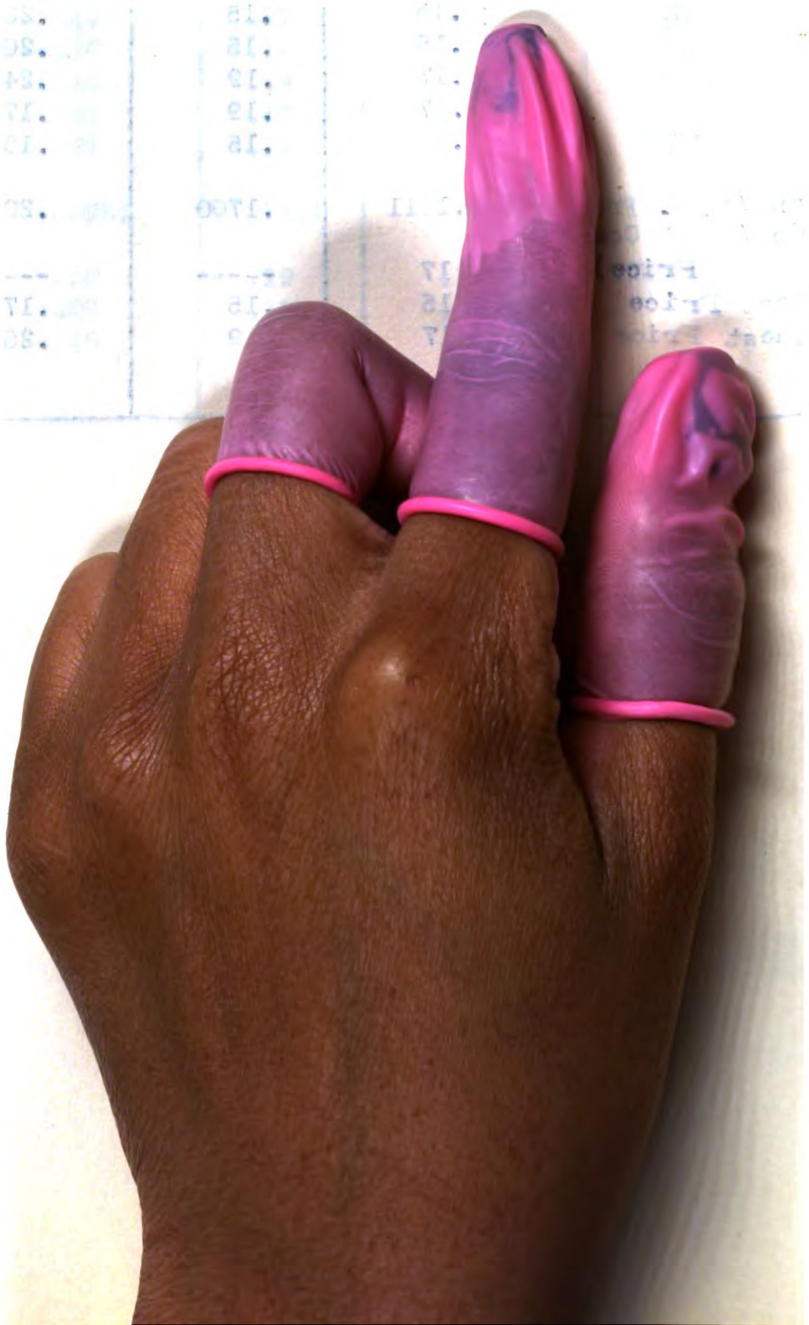

Table XV.

Questionna	Lb. Tomatoes	Piece Cucumber	Bunch Celery	Lb. Onions	Pk. Potatoes	One Grape-fruit Med.64 Tex. Seed-less
		---	.05	.04	.11	M.08
		---	.10	.05	.12	----
		---	.10	.03	.12	M.08
		.20	.10	.05	.13	M.10
		.20	.08	.04	.15	----
			0	.05	.10	M.10
			0	.02	.15	M.07
			2	.05	.20	M.10
				5	.15	----
					.12	M.09
					.13	----
					.12	----
					10	M.08
					0	M.08
					5	----
					15	M.08
					12	M.08
					.15	M.09
					.10	M.07
					.13	M.08
					.10	M.07
					.12	M.09
					.12	----
					.15	M.08
					.13	M.06
Mea				80	.1288	.0826
Mode						
Lowe				05	-----	.08
Hi ghe				02	.10	.06
				.05	.20	.10

Table XVI. - (Sur

Questionnaire	Dozen Cucumber	Bunch Celery	Lb. Onions	Pk. Potatoes	One Grapefruit med. Texas Seedless (6¢)
57	.15	.10	.03	.10	M.06
59	---	.10	.02	.12	M.06
61	---	.10	.04	.10	M.08
63	.15	.10	.04	.10	M.07
65	.12	.10	.03	.10	M.07
67		.10	.04	.09	M.07
		.10	.04	.12	M.08
			.03	.12	M.07
			03	.10	----
			02	.10	M.07
				.12	M.07
				.10	M.08
				.1058	.0781
				.10	.07
				.09	.06
				.12	.08

Table XVII. - (Surve

Questionnaire	Rumfgg's B. F Flakes 12 c	Karo Corn Syrup 1½lb.	Cream of Wheat 28 oz.
3	.25	.13	.25
5	.25	.12	.25
	.25	.13	.25
	.30	.15	.29
1	.25	.12	.25
1	---	---	---
2	.25	.15	.28
2	.25	.15	.25
26	.19	.13	.24
29	2	12	.23
33		13	.25
35			.25
37			.25
39			.24
41			25
47			5
1			
2			
			5
			5
			3
			9

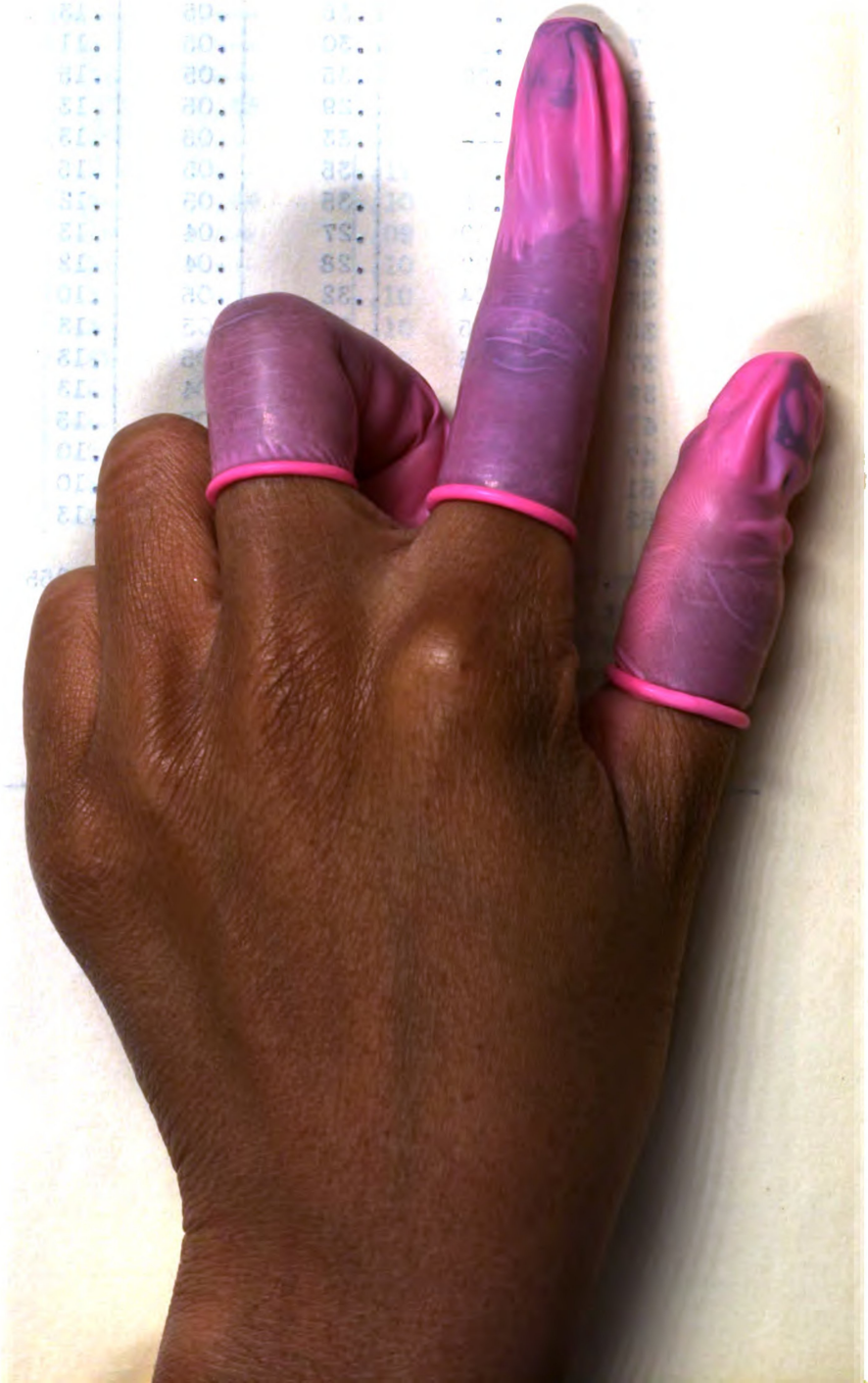

Table XVII. - Co

Questionnaire	nte ns .	Pkg. Salt	Sugar lb.	Campbell's Tomato Soup Can
3		.10	.06	.09
		.10	.07	.10
		.10	.06	.10
		.10	.07	.10
11		.10	.06	.10
15		.10	.06	.10
20		.10		.10
22				.10
26				.10
29				
33				
35				
37				
39				
Mea				
Mode				
Lowes				
Highes				

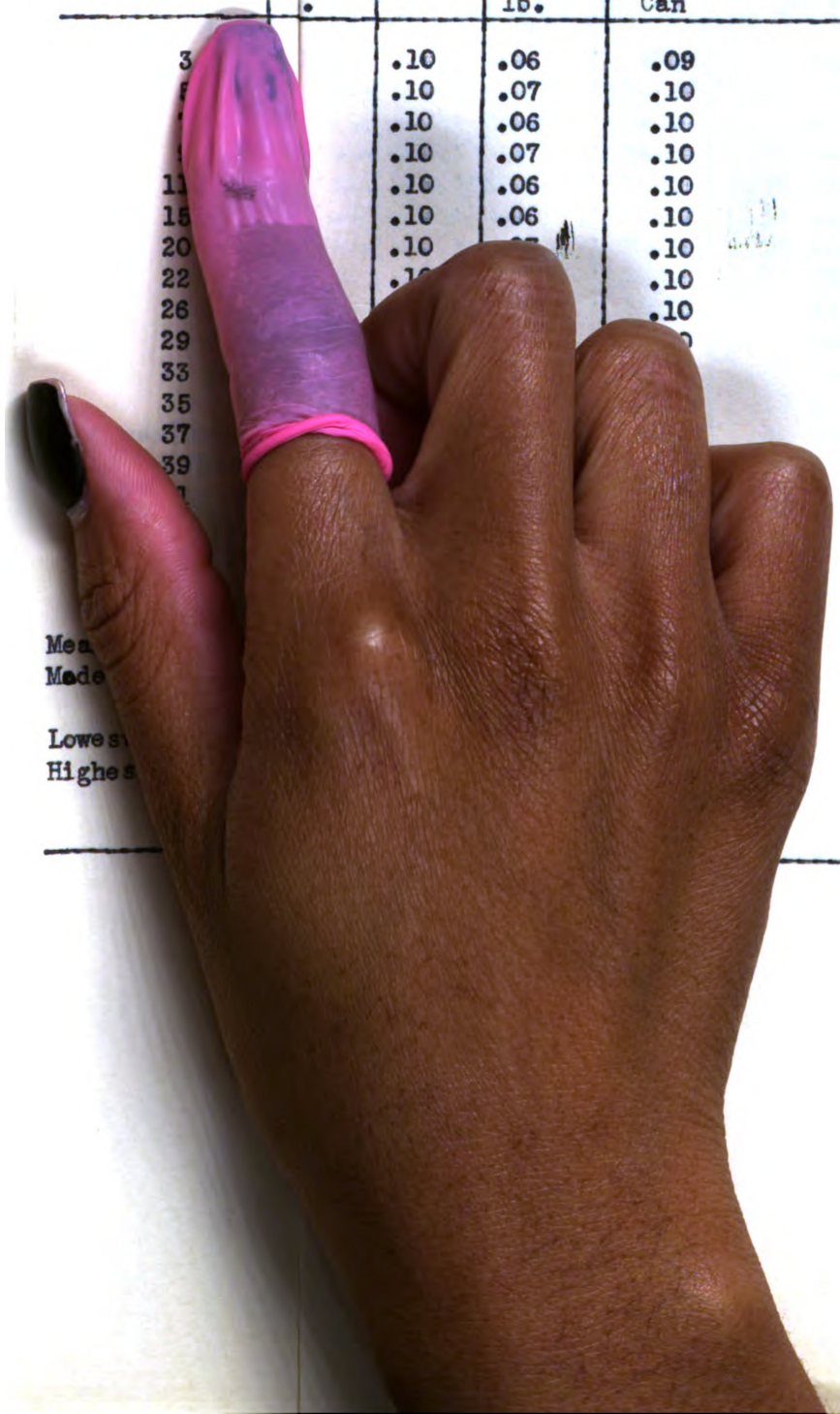

Table XVIII -

Questionnaire	ellogg's orn Flakes kg.	Karo Corn Syrup 1½ lb.	Cream of Wheat 28 oz.
58	08	.12	.21
60	08	.12	.21
62	08	.12	.29
64	08	.12	.21
66	08	.12	.21
68	10	.12	.21
70	08	.12	.21
72	08	.18	.21
4		.13	.21
		.12	.21
			.21
			.24
			.2191
			1
			1
			9

Table XVIII. - Con

Questionnaire	Crite s lb.	Salt pkg.	Sugar lb.	Campbells Tomato Soup Can
58	3	.10	.05	.09
60		.09	.05	.09
62		.10	.05	.08
64		.08	.05	.09
66		.10	.06	.09
68	3	.10	.06	.09
70	3	.09	.06	.09
72	3	.09	.06	.09
74			5	.09
76				.09
78			5	.09
80				
				91