A DETERMINATION OF DESIRABLE FINANCIAL AND
OPERATING RATIOS FOR COOPERATIVE ELEVATORS
IN SOUTHWESTERN KANSAS

by

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of Agriculture and Applied Science, 1934

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A THESIS

submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

KANSAS STATE COLLEGE
OF AGRICULTURE AND APPLIED SCIENCE

1937

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INTRODUCTION

Among problems of cooperative elevators of Kansas, those related more directly to finances and operations are considered by the elevator associations to be of major concern. For any cooperative association to continue successful operation and render the most efficient service to its patrons, it must be in a favorable financial position. A business analysis available to the boards of directors and the entire membership that shows more clearly these problems and how they might be met should be an important step in planning successful operation.

Among the cooperative elevators in Kansas, there has developed the need for a system of analyzing audit statements that not only compares the more common financial and operating ratios but in addition determines the range of desirable ratios that might be used as business guides.

Various business organizations have different types and methods of analyzing audit statements. Bankers and creditors may have their own particular way of analyzing and determining credit risk, all of which are or may be indicative of the financial stability of the business enterprise. While certain ratio comparisons can not be looked upon as faultless barometers of the financial strength of

any business, certainly they can be used in analyzing the problems more carefully and planning more effective financial and operating practices.

PURPOSE OF STUDY

The purposes of this study were to determine a range of desirable ratios that might be used as guides to financial stability.

All the cooperative elevators in southwestern Kansas are engaged in essentially the same type and kind of business and were organized for the same purpose. Even so, there are practices about each business that are characteristic of only that organization. One particular point in a ratio comparison which might be applicable to one association might not necessarily be applicable to another. However, there probably are ranges within the various ratios within which practically all associations might find it desirable to operate. Hence, it becomes the purpose of this study to determine that range. In determining the desirable ratios it becomes of equal importance to find the undesirable range of ratios or that point below which the association would not be operating under acceptable or most satisfactory conditions.

All of the ratios included in this study have been
used in the analysis work of the Extension Division of
Kansas State College and the Department of Agricultural
Economics of the Kansas Agricultural Experiment Station,
Manhattan, Kansas. Desirable ratios have previously been
referred to as standards as determined by what is usually
referred to as good business practice. Earlier studies
have been made such as the work of Green and Rucker (4).
Their study correlates ratios with high income elevators,
those with medium incomes, and those with low incomes.
Their work was done principally on records available for
1931 only.

It further is the purpose of this study to verify or
check the work of Green and Rucker and to supplement their
desirable standards with what might be called ranges of
desirable, acceptable, and undesirable ratios as determined
by a study over a longer period of time.

REVIEW OF LITERATURE

Gilman (2) divides the methods of using ratios into
three groups: (1) ratio analysis of one company for a
fiscal period, (2) ratio analysis of one company for suc-
cessive fiscal periods, and (3) ratio analysis of two or

more companies in the same line of business, usually for
one fiscal period. Some of the factors he lists as affect-
ing the comparability of ratios are (1) nature of products
sold, (2) customer differences, (3) financing methods, (4)
similarity in statement dates, (5) similarity in size, (6)
similarity in accounts, and (7) similarity in location.
Gilman discusses the importance of taking the above factors
into consideration before making ratio comparison studies
of different businesses.

Hardy and Meech (6) state, "The significance of finan-
cial ratios will be greatly heightened when those derived
from the comparative statements of one concern are compared
with like ratios derived from comparative statements of
competitors." They point out that management may take steps
to improve their competitive position by comparing their own
efficiency in using and securing capital with the efficiency
of their competitors, only through the use of ratio com-
parisons. In industry they add that the values of compari-
sons between the financial ratios of competing firms have
played an important part in developing standard ratios for
each industry.

The more important comparisons are discussed by Hardy
and Meech, starting first with the working capital situa-
tion. Here they compare current assets to current liabili-

ties. This afforded their test of the concern's probable
ability to pay its current obligations without impairing
the net working capital. They give the rule-of-thumb meth-
od, two dollars in assets to each dollar in liabilities, as
the ratio most generally considered satisfactory, depending,
for one thing, upon the liquidity of the current assets.
The liquidity of the current assets is listed as being de-
pendent on the (1) cash position, (2) position of cash,
salable securities, and notes and accounts receivable to
total current liabilities, (3) liquidity of receivables,
and (4) liquidity of inventory.

The ratio of net working capital to inventory is given
as another important comparison since the higher the pro-
portion of owned working capital to inventory, the less the
risk that price declines will seriously weaken the finan-
cial position. The ratio needed in this comparison will
depend on the kind of goods making up the inventory. This,
they add, is due to the fact that price fluctuations of
some commodities are greater than for others.

After analyzing the working capital position, Hardy
and Meech turn to the fixed and intangible capital situa-
tion. Here they are interested, first, in the ratio of
sales in dollars to fixed capital and to intangible capital
to show whether fixed investments are becoming too heavy.

First they suggest a ratio showing the dollars of fixed capital per unit of product sold, using units of products sold rather than cash to avoid fluctuating prices.

The ratio of net worth to fixed assets, they believe, will help to tell whether or not the assets are over expanded. Intangibles were disposed of by mentioning that they were usually disregarded in the balance sheet of a young concern.

In getting at the capitalization situation, the ratio of net worth to debt was given first importance since an increase in the ratio is usually considered a healthy sign and one which is of importance particularly to the creditor.

In other financial comparisons Hardy and Meech consider the ratio of fixed assets to funded debt and the value of net worth and surplus to give a basis for examining changes in net worth.

In testing the earning power of net worth and efficiency in using and securing capital, the ratio of net operating profit to total capital reflects the efficiency with which the non-financial departments of the business have used their capital. To determine more properly the responsibility for an increase in the efficiency or decline in use of capital, the writers suggest a comparison of

turnover in working capital, fixed capital, or intangible capital to net operating profit.

Profit margins on sales help to measure the earning power of total capital and the margins on sales. Other operating comparisons which the writers suggest are the ratio of net profit to net worth, which indicates the ability of the concern to earn the going rate of return on owners capital; the ratio of sales to net worth, which measures the turnover of net worth; and the ratio of net profit to sales, which reflects the efficiency of using capital, the efficiency of the financial department, and the proportion of sales involved by expenses.

Hardy and Meech summarize their work by emphasizing the need for consideration of such factors as the stage of the business cycle, the terms of purchase or sale, the type of product, the kind of business, its age and credit standing, and the efficiency of management in statement analysis.

Ettinger and Golieb (1) discuss the significant ratios as those that describe the financial strength such as net worth to assets, which indicates the extent to which the capital of the concern has been contributed by the owners. Those ratios pertaining to sales, which indicates the turnover of all that is being used to produce in the business,

and profit ratios are important in reflecting the ability
of the organization to yield satisfactory earnings. They
suggest such ratios as net earnings to sales, the ratio of
gross earnings to sales, the comparison of net earnings to
assets, and other less important comparisons depending on
the business, as further indicators of the business' ability
to yield satisfactory earnings.

Green and Rucker made a study of between 35 and 40
cooperative elevators in southwestern Kansas in 1931 in
which they grouped the elevators into three classes as
follows: (1) those showing a net profit of $1,100 or less,
(2) those showing a net profit of between $1,100 and $9,000
a year, and (3) those showing a profit of $9,000 or more a
year. The membership records used were taken from the
business for 1930 only.

In their study of membership they found the least
profitable elevators had too small a membership, too small
a patronage, or both. In the least profitable group, seven
of eleven elevators had memberships of less than 100. The
next most profitable group had only four of ten elevators
with a membership of less than 100. In the most profitable
group, only two of eighteen elevators had a membership of
less than 100. Their study showed that 73 per cent of the
low income group had less than 80 per cent patronage, the

middle income group had 60 per cent of the elevators with less than 80 per cent patronage, while in the high income group only 33 per cent had less than 80 per cent patronage.

Their study of current assets to current liabilities showed that the highest income group consistently maintained $1.50 to $3 worth of current assets to each dollar of current liabilities. In the next highest income group only a little more than one-third maintained a $1.50 to $3 ratio. They concluded that the traditional $2 to $1 ratio is closely associated with successful operation.

In comparing quick assets, such as cash and receivables, to current liabilities, Green and Rucker found that 38 per cent of the low income elevators showed a ratio of less than .9 to 1. In the medium income group 33 1/3 per cent showed a ratio of less than .9 to 1, while in the high income group a little more than 15 per cent showed a ratio of less than .9 to 1. They concluded the traditional ratio of one dollar to one dollar is associated with successful financial management of cooperative elevators.

In making a study of sideline sales to receivables, Green and Rucker refer to a credit standard of annual sales being equal to 12 times that of receivables. This credit standard would be the equivalent of collections every 30 days or at the end of the year there would remain on the

books the equivalent of 30 days uncollected accounts. In only four of 71 cases did the country elevators meet this standard and three of the four cases were in the high income group. When sales were compared to depreciated fixed assets, 70 per cent of the low income group showed less than $12.50 of sales for each dollar invested in net fixed assets. In the medium income group 33 1/3 per cent showed less than the $12.50 ratio and in the high income group only 23 per cent fell below the $12.50 standard.

Their study of the ratio of net worth to fixed assets showed 24 per cent of the low income group to have less than $1 of net worth for each dollar of fixed assets, 17 per cent in the medium income group, and 8 per cent in the high income group.

In the operating comparisons, using the ratio of total operating cost to gross income, the medium and high income groups showed a margin of 3.6 cents on the dollar, so in their study they considered a 4 cent margin on the dollar as a reasonable one. None of the low income group met this standard while four of the medium income group and 16 of the high income group did. In the same study a margin between cost of sales and sales of at least 6 cents per dollar seemed to be desirable. In the ratio of expenses to sales, 60 per cent of the low income group showed more than

4 cents for each dollar of sales. However, the high income group of elevators had 56 per cent of their number showing expenses in excess of 4 cents per dollar of sales.

In their study of the ratio of cost of wheat sales to wheat sales they found margins of 2, 3, 4, and 5 cents were more generally charged. Twice as many elevators took a 4 cent margin as took any other. In the low income group nine of 20 elevators took as much as a 4 cent margin, 13 of 23 in the medium income group and 21 of 25 in the high income group also took a 4 cent margin. When cost of sideline sales were compared to sideline sales they found that elevators maintaining at least a 15 per cent margin were most frequently in the high income group.

In a study of the ratio of salaries and wages to total expenses, 32 per cent of the low income group had in excess of 60 per cent of expenses made up of salaries and wages, 18 per cent in the medium income group, and only 8 per cent of the high income group had in excess of 60 per cent of expenses made up of salaries and wages. In comparing salaries and wages to gross sales, the same study found between 2 and 3 per cent to be a reasonable standard. In other words 2 to 3 per cent of the total gross sales should be a representative standard of salaries and wages.

The last comparison discussed by Green and Rucker was
on capacity turnover. They found those elevators having a
turnover of six to ten times their capacity to be more
closely associated with high income while those having
less than a six to ten times turnover were associated with
lower income.

Green (3) in another published study uses membership,
financial, and operating standards in discussing the status
of cooperative elevators in Kansas for the period 1931-1934.
The standards used are quite comparable to the above study
by Green and Rucker. However, in this study he attempts to
analyze the factors responsible for the varying standards
and where possible to outline how Kansas cooperative eleva-
tors might reduce risks.

Mather (7) in an unpublished study, "Sidelines and
Their Effects on Net Operating Profits of Kansas Coopera-
tive Elevators", states that southwestern Kansas elevators
maintaining margins of 15 cents per dollar of sideline
sales realized larger profits than those with smaller mar-
gins. In the study of eastern Kansas elevators he conclud-
ed the elevators realizing a margin of 10 cents or more per
dollar of sideline sales had two chances out of three to
occur in the more profitable group consisting of 50 per
cent of the elevators. With less than 10 per cent there

was only one chance in three of occurring in this group.

Rucker (8) in an unpublished study of expense and margin per dollar of sales in cooperative elevators in relation to net profit during periods of price changes, concluded that volume was probably the most important factor in determining successful operation. Previous writers have pointed out the limitations of certain ratios in reflecting the exact change in the business due to price fluctuations. Rucker in this work makes a detailed study of how fluctuating prices affect the variation in expense and margins as compared to dollar sales which improves the value of any comparison made of those items on the dollar basis. He states, "Expenses, either total or labor, per dollar of sales, will increase as the price of the commodity decreases, and will be largest at the lowest price. The expense per dollar of sales declines as the unit price of the commodity increases."

Hall (5) in an unpublished study of the source of capital used by 40 cooperative elevators in southwestern Kansas, states, "Organizations having two dollars or more of surplus for each dollar of capital stock are generally more successful than those having a lower ratio of surplus to capital stock." In a phase of the study pertaining to the ratio of working capital to original investment in

fixed capital he concluded the more successful associations to be those maintaining at least $1.30 of working capital for every dollar of original investment in fixed capital. He associates a large number of member patrons with a high per cent of the total capital provided by surplus.

SCOPE AND METHOD OF PROCEDURE

This study was made on 50 cooperative elevator associations in southwestern Kansas for the five year period 1931-1935 inclusive. The association records used in this study were those on which a business analysis survey had been conducted by the Extension Division of Kansas State College and the Department of Agricultural Economics of the Kansas Agricultural Experiment Station, Manhattan, Kansas. The Extension Service fieldmen collected the audit records and other supporting data in connection with the project in grain marketing. The elevator records were each given a number and placed in the files of the Department of Agricultural Economics. These served as a source of material for this study. All of the audit records are from bonded auditor's reports.

The 50 elevators used in the study are located in 21 southwestern Kansas counties as shown by the map in Figure 1 which markes their location.
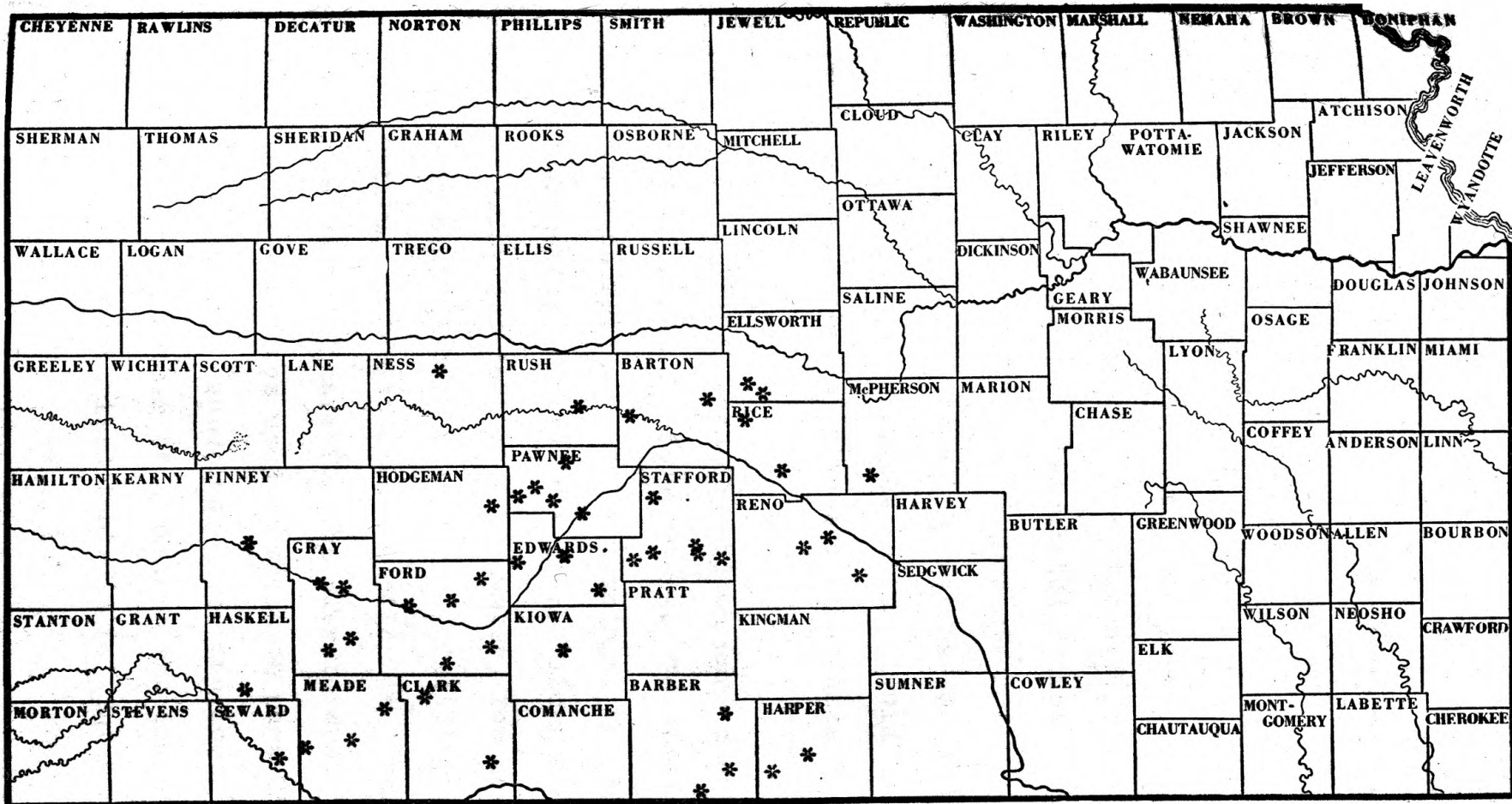
Figure 1. Location of Elevator Associations Used in the Study.

The number of elevators used in the study represents the entire list of elevators for which there are audit reports for the consecutive years covered by the study.

In organizing the data, the elevators were listed in numerical order according to file number for each of the five years showing the calculated ratios in their respective columns, depending on which comparison the ratio represented. After having grouped the ratios for each of the comparisons for each year, the ratio calculations were rounded to the same number of places for purposes of making an array.

The ratios of each comparison were then arrayed from low to high for each of the years. To study successful operation measured in terms of earnings, the rate of gain for each respective elevator was placed along side its location in the array as identified by number, for each of the respective comparisons by years. By dividing each array for the various comparisons into deciles and averaging the rates of gain by years for the elevators falling in the deciles, a table was used as shown on page 23. This table, as well, shows the actual or upper and lower ratio for each decile and the number of elevators showing a gain or loss.

The above described table is not intended to show a summary for the five years, but rather to show what actually

happened by years for those elevators in a particular ratio range according to the comparison made.

For purposes of making a study of the entire five year period, frequency distributions were made of each of the comparisons showing the number of elevators falling within the class intervals by years and the number of elevators making a gain or loss for each distribution or class interval. The total number of the cases or records falling within each frequency and an average of the rates of gain of each group for the five year period was used to construct a bar chart as shown on page 25.

The class interval groupings in the chart have been divided into ranges of desirable, acceptable, and undesirable ratios, or a combination of the three, depending on the results found in each of the comparisons.

Three methods were used in determining the rates of gain as a measure of accomplishment of the elevators, depending on the comparison made. The three methods are: (1) rate of gain on net worth, (2) rate of gain on dollar sales, and (3) amount of earning per active member. The first method, the rate of gain on net worth, was used as the measure of accomplishment for all comparisons in the working capital analysis, fixed capital analysis, capitalization situation analysis, and for the comparisons of net earning

and gross earning to total sales. The rate of gain on dollar of sales was used as a measure of accomplishment for all but the first two comparisons classed under the financial operation study and for the association membership and capacity turnover comparisons classed under volume of business. The amount of earning per active member was used as a measure of accomplishment for comparisons involving the per cent of membership patronizing the association.

The rate of gain or net worth represents the total net earning per dollar of net worth. The rate of gain on dollar sales represents the total net earning per dollar of total sales and the amount of earning per member patron represents the amount of earning per member patronizing the association.

These methods were arbitrarily chosen as the best means of measuring accomplishments for each of the particular comparisons before that method was correlated or studied in connection with the array.

DEFINITION OF TERMS

1. Comparison - refers to the ratio of one audit item to another, (e.g. comparing current assets to current liabilities).

2. <u>Ratio</u> - is the relationship obtained by dividing the first mentioned item by the second mentioned item.

3. <u>Audit</u> - **refers** to the business statement made annually at the end of the calendar **or** fiscal year and covering the current crop year.

4. <u>Elevator</u> <u>or</u> <u>Elevator</u> <u>Association</u> - refers to one of the 50 cooperative elevator associations included in the study.

5. <u>Records</u> <u>or</u> <u>Cases</u> - refers to one or more of the 250 individual annual records of the 50 elevator associations.

6. <u>Total</u> <u>Net</u> <u>Earning</u> - refers to all income on operations plus other income.

7. <u>Other</u> <u>Income</u> - refers to all income not derived from buying and selling operations such as revenue from storage dividends and rebates from regionals, income from grinding, etc.

8. <u>Margin</u> - means the difference between cost of sales and sales on a dollar basis.

9. <u>Desirable</u> <u>Range</u> - refers to that group of ratios as selected from one or more intervals of the frequency study which is indicative of most successful operations.

10. Acceptable Range - refers to that group of ratios as selected from one or more intervals of the frequency study which is indicative of neither best results nor undesirable results, but satisfactory operating results.

11. Undesirable Range - refers to that group of ratios as selected from one or more intervals of the frequency study which is indicative of losses or unsatisfactory operating results.

WORKING CAPITAL ANALYSIS

Ratio of Current Assets to Current Liabilities

The ratio of current assets to current liabilities is figured by dividing the current assets by the current liabilities. The current assets, which are mainly cash in the bank, inventory, and accounts receivable, include all assets other than fixed investments in building, real estate, and equipment. Current liabilities include all the liabilities of a short term character which fall due within 12 months from the date of the audit. This includes such items as accounts and notes payable and accrued expenses, including patronage dividends and stockholder dividends declared but not paid.

The comparison of current assets to current liabilities
is particularly important from the standpoint of determin-
ing the association's ability to pay its current obligations
and still have sufficient funds for working capital. It is
to be expected that the desirable ratio between current as-
sets and current liabilities varies with the composition or
liquidity of the current assets. The liquidity in most
cases will depend upon the condition of the notes and ac-
counts receivable plus the amount of cash in the bank.
This emphasizes the importance of a supplementary study
which compares cash and cash and receivables to current
liabilities.

Table 1 divides the array of the ratio of current
assets to current liabilities into deciles of five eleva-
tors each and shows the high and low ratio for each decile
by years. The number of elevators showing a gain and the
number showing a loss and the average rate of gain or loss
for each decile are given. From this table the actual ratio
range for the elevators having the highest average rate of
gain may be observed. It is noted in comparing one year to
another that from 1931 to 1935 each year tended to have an
increase over the preceding year of current assets in pro-
portion to current liabilities. This increase in the ratio
occurred even though earnings and volume of business were

Table 1. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Current Assets to Current Liabilities.

1931				1932				1933				1934				1935			
Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss
.97				.77				.45				.58				.61			
1.26	3	2	10.58	1.12	0	5	-16.88	1.06	0	5	-43.07	1.62	0	5	-11.13	1.67	2	3	10.11
1.27				1.16				1.14				1.65				1.83			
1.59	4	1	13.13	1.65	2	3	1.03	1.97	2	3	- 2.01	2.30	2	3	11.27	2.33	4	1	3.28
1.66				1.87				1.99				2.32				2.61			
2.10	4	1	20.12	2.32	4	1	9.90	2.43	3	2	11.87	2.93	3	2	6.36	2.98	3	2	7.84
2.24				2.36				2.55				2.94				3.16			
2.52	4	1	20.56	3.10	3	2	6.08	3.06	3	2	6.17	3.95	2	3	.50	3.63	3	2	9.14
2.59				3.69				3.12				4.05				3.74			
2.80	5	0	24.14	4.35	5	0	15.49	4.71	2	3	2.41	5.44	2	3	.60	4.53	2	3	.47
2.82				4.53				5.08				5.78				5.25			
3.50	4	1	10.54	4.98	3	2	7.70	5.98	4	1	8.48	6.34	5	0	7.64	7.03	4	1	1.96
3.65				5.39				6.36				6.52				7.22			
4.45	5	0	21.92	8.08	5	0	10.08	8.12	4	1	5.61	9.21	4	1	7.19	11.15	4	1	7.01
4.68				8.18				8.33				10.56				12.22			
5.59	4	1	3.76	12.90	2	3	1.49	10.06	3	2	3.69	19.36	5	0	6.21	14.78	4	1	4.55
6.10				12.95				15.22				19.89				16.52			
11.33	4	1	5.08	27.29	1	4	- 4.64	195.15	3	2	.36	112.90	3	2	1.04	181.30	4	1	5.67
11.98				33.10				201.00				243.97				511.34			
151.99	3	2	2.51	216.00	4	1	3.46	No C L*	3	2	1.09	No C L	4	1	5.50	No C L	3	2	.06

* No Current Liabilities.

comparatively low in 1932 to 1935. The same trend persists even when prorates and stock dividends, declared but not paid, are taken out of current liabilities.

Figure 2 shows the effect of variation in the ratio of current assets to current liabilities and the average rate of gain for the five year period. The figure also shows the number of elevator records falling within each range and the per cent of those showing a loss. This means that in the five year summary there are five annual records for each elevator, or a total of 250 cases.

Those elevators having a ratio of less than 1.0 had a high average rate of loss. Twenty-two elevator records with the range from 1.0 to 1.49 had an average rate of gain of only 1.27 per cent. The elevators with the highest average rate of gain fell in the range of 1.5 to 6.49. Elevator records occurring in the ranges with a ratio above 6.49 did not average as high a rate of gain but the per cent showing a loss was comparatively small.

Possibly two explanations should be made for the elevator records with a range of 1.5 to 6.49 having a higher average rate of gain than those of higher ratios. The first and important reason is that the association with the larger earnings, and having these earnings listed as prorates and stock dividends payable under current liabilities,

Rate of
Gain

Per Cent
Showing Loss

Per Cent Showing Loss

Rate of Gain

	Un-desirable		Desirable											Acceptable						

(Range of Ratios)

0 to .49	.50 to .99	1.0 to 1.49	1.5 to 1.99	2.0 to 2.49	2.5 to 2.99	3.0 to 3.49	3.5 to 3.99	4.0 to 4.49	4.5 to 4.99	5.0 to 5.49	5.5 to 5.99	6.0 to 6.49	6.5 to 6.99	7.0 to 7.49	7.5 to 7.99	8.0 to 8.49	8.5 to 8.99	9.0 to 9.49	9.5 or more

(Number of records falling within each range)

1	10	22	19	20	23	12	13	10	11	9	5	8	5	2	3	7	3	4	63

Figure 2. The Effect of Variation in the Ratio of Current Assets to Current Liabilities
on the Average Rate of Gain on Net Worth for the Period 1931-1935.

lessens its ratio of current assets to current liabilities which tends to shift it to a lower group from the ratio standpoint. A separate study in which prorates and stock dividends declared were taken out of both liabilities and assets bears out this assumption.

The second reason may be that those elevators which borrow and are able to maintain at least $1.50 in current assets for each dollar of liabilities, find it possible to pay interest and have sufficient earnings in addition to operate on a larger earning basis.

As a guide in determining the proportion of current assets to current liabilities, Figure 2 divides the ranges as follows: (1) a ratio of less than $1.49 of current assets to one dollar of current liabilities is undesirable, (2) a ratio of $1.50 to $6.49 of current assets for each dollar of current liabilities is desirable, and (3) a ratio of $6.50 or more of current assets to one dollar of current liability is acceptable.

In distinguishing between the desirable and undesirable ratios it appears quite evident that, in general, those elevators falling in the range below 1.5 to 1.0 have a much greater probability of showing a loss. Sixty-four per cent of the 22 cases falling within the range of 1.0 to 1.5 did show a loss. Ten of these had a ratio of above

1.35 but six of the ten cases showed a loss which indicates that a desirable range could not advisably be placed below 1.5. Any of the ratios above 1.5 might be listed as desirable subject to the following limitations: (1) that the assets be reasonably liquid, (2) that the receivables include only a small percentage, if any, of uncollected accounts and notes, and (3) that the organization carry a reasonable amount of cash for trading purposes.

Green and Rucker found in their study that $2 in current assets should be maintained for each $1 of current liabilities.

Ratio of Cash and Receivables to Current Liabilities

This ratio is obtained by adding to cash on hand and cash in the bank all notes and accounts receivable and dividing the sum by the current liabilities. In current liabilities are included the same current obligations discussed in the preceding comparison.

The purpose of this comparison is to supplement the preceding study by determining the liquidity of the current assets. Cash and receivables are two of the more important items of current assets and for this reason it is important to know to what extent they cover the current debt. It is of even greater concern to determine whether or not the

current liabilities may be disposed of without hindering the working capital position. Table 2 is of interest wherein a more detailed study by years is desired than can be made from Figure 3. In general the larger gains occur in the middle deciles for each of the years. In these deciles the actual range varies from 1.45 to 3.46 in 1931, from 1.52 to 3.70 in 1932, from .86 to 4.28 in 1933, from 1.45 to 4.82 in 1934, and from 1.71 to 8.05 in 1935. The only decile in which an average rate of loss occurred was in the upper or lower two deciles where the ratios are extremely high or extremely low. Summary results for these years are more clearly shown in Figure 3.

The largest percentages of losses and the only ranges where an average rate of loss occurred was where the ratio was below .75. Above this point few elevators showed a loss and larger average rates of gain were obtained. An acceptable range would be for an elevator to have 75 cents to two dollars of cash and receivables back of each dollar of current liabilities. Since there appears to be no special, if any, advantage of an elevator association maintaining more than $2.75 in cash and receivables for each dollar of current debt, a range of $2 to $2.75 is used as the desirable situation. Any ratio then above $2.75 might be classed as an acceptable range.

Table 2. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Cash and Receivables to Current Liabilities.

1931 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1932 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1933 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1934 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1935 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
.29 – .64	3	2	7.78	.31 – .65	0	5	-12.79	.22 – .40	0	5	-36.14	.27 – .46	2	3	- 9.77	.31 – .73	2	3	- 4.88
.68 – .91	4	1	15.45	.69 – .91	3	2	- .37	.54 – .72	3	2	- 4.25	.50 – .97	2	3	2.21	.93 – 1.29	5	0	19.17
.94 – 1.36	3	2	2.94	.91 – 1.36	3	2	1.32	.86 – 1.15	3	2	4.69	1.19 – 1.41	2	3	.84	1.39 – 1.70	1	4	- 6.05
1.45 – 1.61	4	1	14.70	1.52 – 2.07	3	2	9.24	1.26 – 1.57	2	3	10.59	1.45 – 1.99	1	4	10.40	1.71 – 1.95	3	2	8.36
1.75 – 1.88	4	1	13.41	2.15 – 2.76	4	1	10.74	1.66 – 2.30	2	3	.62	2.10 – 2.92	2	3	1.48	2.36 – 2.82	3	2	11.71
2.04 – 2.33	5	0	30.50	2.80 – 3.70	5	0	15.58	2.86 – 3.21	3	2	3.96	3.21 – 4.12	4	1	10.17	2.96 – 3.85	4	1	4.33
2.33 – 2.49	5	0	26.24	3.84 – 4.56	3	2	4.65	3.25 – 4.28	4	1	7.45	4.13 – 4.70	5	0	8.59	4.65 – 5.81	4	1	7.07
2.52 – 3.46	5	0	16.27	4.69 – 6.83	2	3	4.71	4.38 – 7.04	5	0	7.14	4.82 – 8.78	5	0	5.34	5.84 – 8.05	4	1	7.08
3.50 – 7.64	4	1	6.78	7.10 – 8.44	3	2	- 1.97	7.63 – 100.80	2	3	- .06	9.85 – 48.00	3	2	.44	9.88 – 71.63	4	1	3.23
9.05 – 103.19	3	2	2.29	9.29 – 149.16	3	2	3.20	113.76 – No C L	3	2	.59	129.23 – No C L	4	1	5.50	313.44 – No C L	3	2	.06

Rate of
Gain

Per Cent
Showing Loss

☐ Per Cent Showing Loss

■ Rate of Gain

| | | | Un-desir-able | | Acceptable | | | | | Desirable | | | | Acceptable | | | | | | | | |

(Range of Ratios)

0 to .24	.25 to .49	.50 to .74	.75 to .99	1.00 to 1.24	1.25 to 1.49	1.50 to 1.74	1.75 to 1.99	2.00 to 2.24	2.25 to 2.49	2.50 to 2.74	2.75 to 2.99	3.00 to 3.24	3.25 to 3.49	3.50 to 3.74	3.75 to 3.99	4.00 to 4.24	4.25 to 4.49	4.50 to 4.74	4.75 or more

(Number of records falling within each range)

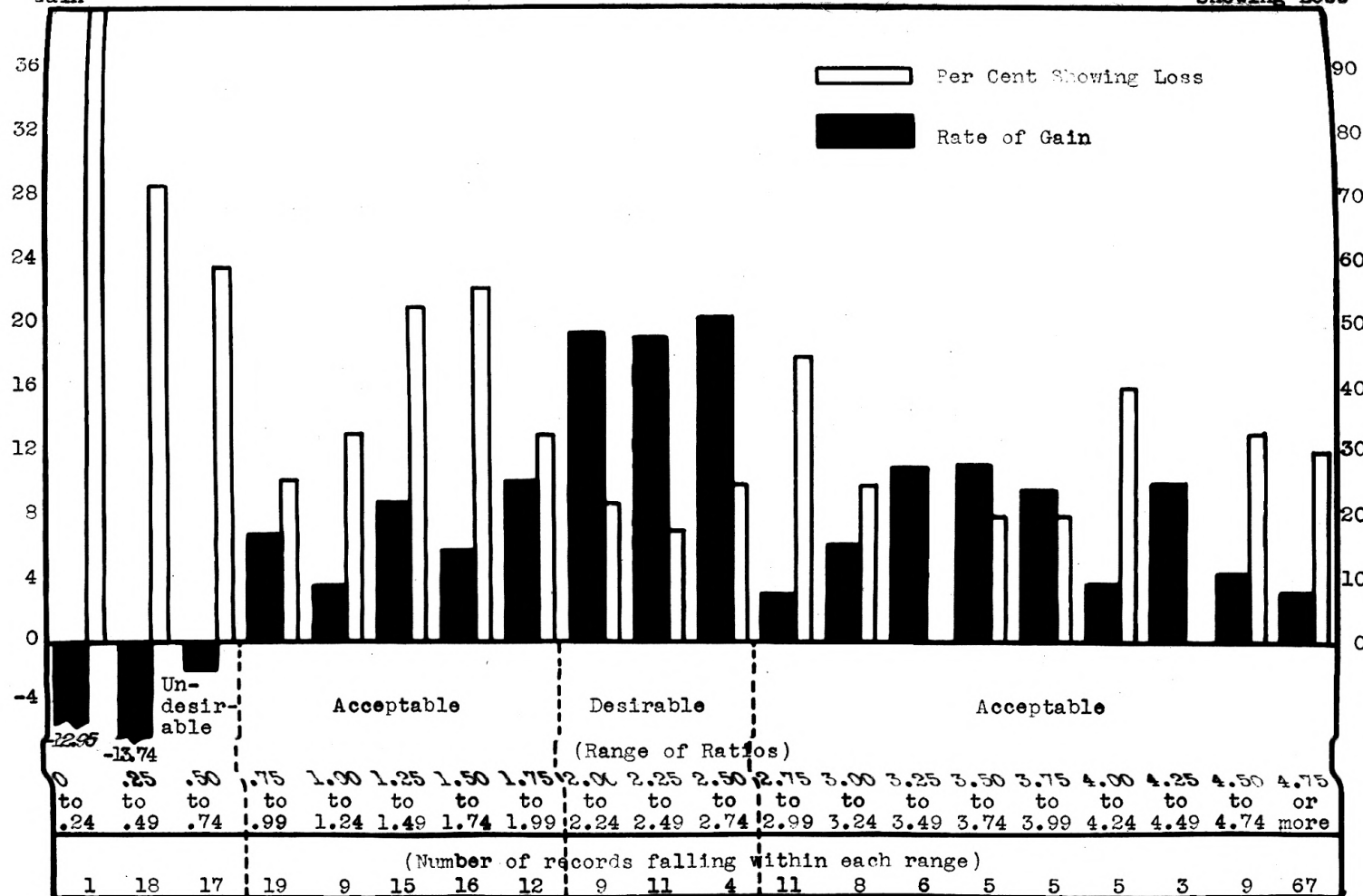| 1	18	17	19	9	15	16	12	9	11	4	11	8	6	5	5	5	3	9	67

Figure 3.   The Effect of Variation in the Ratio of Cash and Receivables to Current Lia-
bilities on the Average Rate of Gain on Net Worth for the Period 1931-1935.

30

Ratio of Cash to Current Liabilities

In figuring this ratio, add the cash on hand and in the bank and divide by the current liabilities. In current liabilities are included the same items as were included in the ratio of current assets to current liabilities.

As in the preceding study, cash to current liabilities gives a more detailed analysis of the liquidity of current assets. It is important to compare the cash at hand on any date with the liabilities shortly to fall due. Enterprising managers will adjust their current assets to meet all debts promptly without impairing the working capital position, if such is within their power.

Table 3 shows 12 deciles out of 50 in which average rates of loss occur. In all but three there was less than 30 cents cash for each dollar of current liabilities. In none of the years does there appear to be any especial advantage for an association to have an extremely large amount of cash in proportion to current liabilities. In all years the largest gain occurred in the intermediate deciles.

Referring back to Figure 3 on page 30 it is recalled there should be not less than 75 cents in cash and receivables for each dollar of current liabilities. From Figure 4 it is evident that the greater part of cash and receiv-

Table 3. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Cash to Current Liabilities.

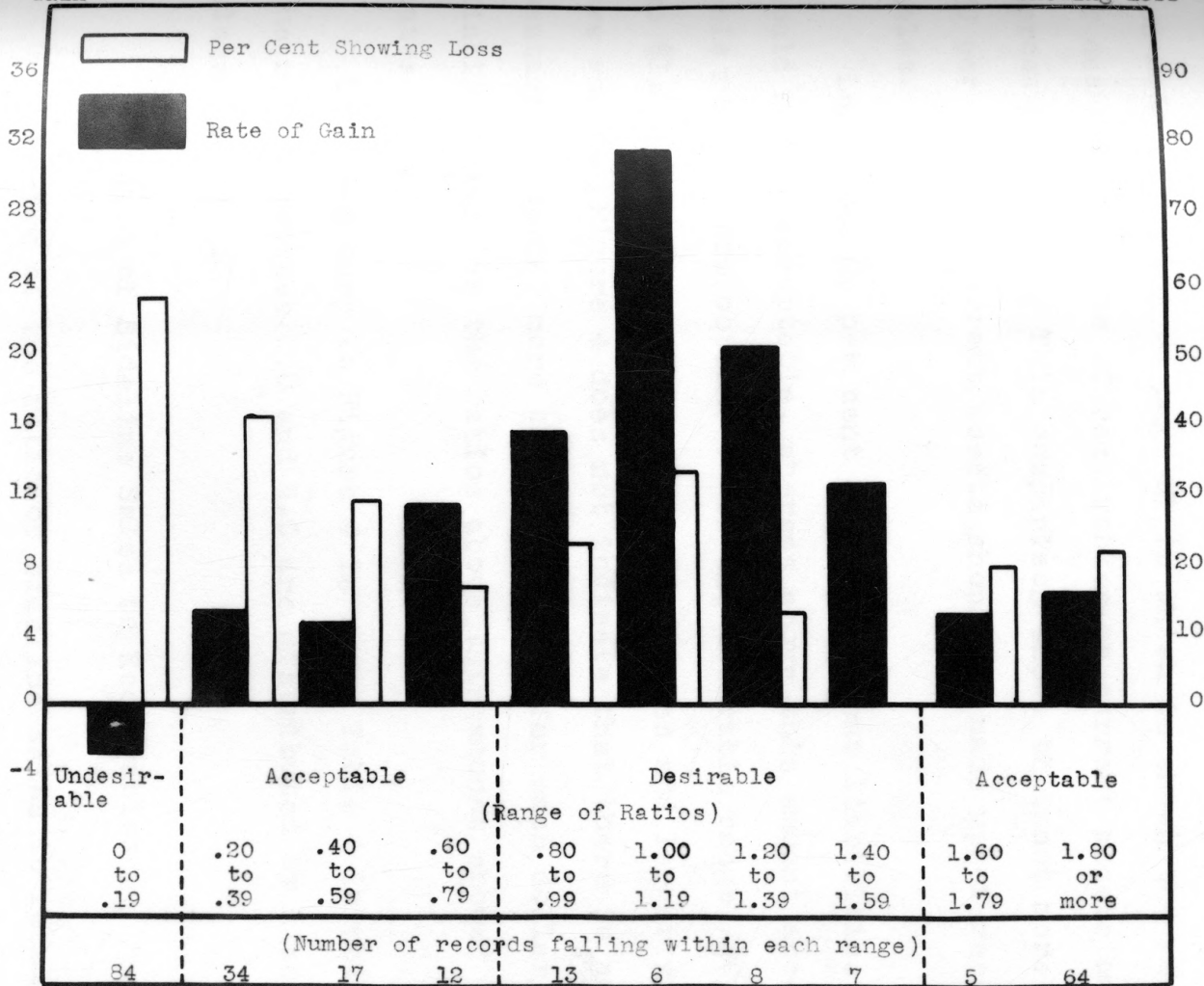| 1931				1932				1933				1934				1935			
Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
.001 .03	3	2	4.30	.003 .04	3	2	3.25	.01 .03	1	4	- 5.39	.00 .03	0	5	-11.45	- .16 .05	2	3	- 4.38
.04 .09	5	0	14.66	.04 .06	2	3	1.09	.03 .07	0	5	-38.49	.03 .10	0	5	- 4.94	.06 .15	3	2	.92
.10 .19	3	2	1.51	.07 .09	0	5	- 8.11	.07 .12	2	3	2.04	.10 .12	3	2	2.47	.17 .20	4	1	2.23
.20 .21	4	1	9.14	.09 .16	2	3	- 8.89	.15 .23	2	3	- 1.02	.16 .30	3	2	2.64	.24 .29	1	4	- 5.49
.21 .36	4	1	22.41	.19 .45	4	1	11.30	.24 .49	3	2	4.39	.31 .44	3	2	- .45	.30 .79	2	3	- 1.34
.37 .74	3	2	6.57	.46 .74	4	1	8.57	.57 .72	5	0	6.74	.48 1.19	3	2	18.10	.82 1.04	5	0	23.79
.78 .89	5	0	28.53	.75 1.27	3	2	6.49	.81 1.12	3	2	14.13	1.22 2.09	5	0	7.25	1.15 3.27	4	1	18.46
1.18 1.46	5	0	25.83	1.31 1.69	3	2	14.22	1.20 1.91	4	1	3.49	2.13 3.33	5	0	12.03	3.55 4.66	5	0	10.16
1.72 3.00	4	1	18.65	2.39 4.86	5	0	10.01	2.35 25.50	4	1	8.10	3.63 41.32	4	1	4.04	4.90 66.57	5	0	5.71
3.67 35.02	4	1	4.76	5.65 65.44	2	3	- 3.62	89.92 No C L	3	2	.59	113.41 No C L	4	1	5.51	66.95 No C L	2	3	.02

Figure 4. The Effect of Variation in the Ratio of Cash to Current Liabilities on the Average Rate of Gain on Net Worth for the Period 1931-1935.

ables should be composed of cash. In this figure the most desirable range occurs where the ratios are from $0.80 to $1.60. These results correspond very well with the comparison made beginning on page 43 in which is shown the range of desirable ratios of receivables to current assets on a percentage basis. This comparison shows that not more than 30 per cent of current assets should be made up of receivables.

Less than 20 per cent cash to current liabilities would not be acceptable, whereas above this amount acceptable results are obtained. In the desirable range, $0.80 to $1.60, the probability of loss is less and larger gains are shown. Figure 4 does not indicate that there is an advantage in having more than $1.60 cash for each dollar of liabilities since the ratios above this amount showed low rates of gain.

Supplementary to Figure 4 is shown Table 4 in which the ratios between 0.0 and 6.0 are distributed by a smaller class interval.

Ratio of Sideline Sales to Receivables

To arrive at the ratio of sideline sales to receivables, divide the sideline sales by the total of accounts and notes receivable. This ratio represents the number of

Table 4. The Effect of Variation in the Ratio of Cash
to Current Liabilities on the Average Rate of
Gain on Net Worth for the Period 1931-1935.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
.00 to .09	55	65	- 4.95
.10 to .19	29	45	1.44
.20 to .29	23	48	4.75
.30 to .39	11	27	6.44
.40 to .49	10	30	6.10
.50 to .59	7	29	2.69

dollars of sideline sales for each dollar put on the books in receivables.

It has long been an accepted standard and has been used in the Extension Service that collections should be made once every 30 days. This is a ratio of $12 in sales for each dollar put on the books, or at the end of the year there would remain on the books the equivalent of 30 days uncollected receivables. This ratio, however is not necessarily representative of each current year's business since uncollected receivables usually are carried over from previous years which brings down the average. In Green's and Rucker's study they found only four out of 71 cases meeting the 12 to 1 standard but three of the four were high income elevators making more than $9,000 net income. None of the four cases mentioned by Green and Rucker as meeting the 12 to 1 standard in 1931 are included in this study as may be observed from Table 5 since audit records for none of these elevators were available for all five years covered by this study.

From 1931 to 1935 there has been an improvement in collections. While there were no elevators, as included in this study, meeting the 12 to 1 standard in 1931 or 1932, one did in 1933, three in 1934, and nine in 1935. Of these 13 cases only one elevator made a loss in 1935

Table 5. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Sideline Sales to Receivables.

	1931				1932				1933				1934				1935		
Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss
.00 .64	1	4	- 8.90	.00 .00	2	3	-13.39	.00 .73	0	5	-10.36	.00 .80	0	5	- 3.48	.00 1.28	3	2	2.13
.77 1.24	5	0	19.58	.45 1.02	2	3	2.36	.76 .94	3	2	2.52	.91 1.33	3	2	9.31	1.34 1.93	3	2	7.54
1.41 1.69	5	0	12.88	1.02 1.30	2	3	.54	.97 1.45	3	2	-26.08	1.47 1.92	2	3	- 1.26	2.04 2.74	2	3	5.49
1.69 1.88	3	2	9.40	1.39 1.50	4	1	5.96	1.63 1.93	1	4	- 1.30	1.99 2.75	3	2	- 1.08	2.84 3.33	2	3	.31
1.92 2.48	5	0	18.95	1.53 1.80	3	2	9.12	1.94 2.24	2	3	2.33	2.79 3.04	2	3	1.63	3.84 4.35	3	2	1.11
2.55 2.70	4	1	19.78	1.92 2.45	4	1	9.80	2.25 2.86	3	2	1.26	3.14 5.01	4	1	3.99	4.48 5.42	3	2	.24
2.81 3.77	4	1	15.06	2.48 2.81	2	3	- 1.62	2.92 4.29	4	1	3.70	5.16 6.36	4	1	- 2.26	5.55 6.99	4	1	- 1.64
4.15 5.20	5	0	14.16	2.97 4.66	3	2	4.73	4.35 5.33	5	0	13.75	6.43 8.14	4	1	3.89	7.31 10.82	4	1	16.95
5.84 7.30	4	1	14.22	5.15 5.84	4	1	10.42	5.91 7.75	3	2	3.75	8.59 10.66	3	2	2.19	11.27 18.79	4	1	4.45
7.37 9.40	4	1	21.21	6.44 10.12	3	2	6.40	9.37 14.40	3	2	5.01	10.77 22.73	5	0	22.27	19.60 25.77	5	0	13.49

and the loss was small and all but three cases made a rate
of gain of better than 8 per cent on net worth, and the
average rate of gain was 10.96 per cent. The actual range
of every decile for 1934 and 1935 was above that for the
corresponding decile in 1931.

Figure 5 shows the effect in variation of sideline
sales to receivables on rate of gain by the frequency meth-
od with a class interval of 2.0. For a more detailed study
of this chart, Table 6 is included as a supplement where
the class interval is narrowed to 1.0.

It may be readily observed that the largest gains oc-
curred where the elevators had $8 or more sideline sales to
each dollar of receivables. As sales to receivables in-
creased there was a gradual increase in the rate of gain
up to and including the range 8.0 to 9.9. For this same
distribution there also was a tendency for the per cent
showing a loss to decrease as the proportion of sales in-
creased. Unquestionably the desirable or accepted range
is above 8.0 while less than this amount may be either un-
desirable or questionable, depending on the collectibility
of the receivables.

As previously mentioned, the inclusion of receivables
carried over from previous years tends to lower the pro-
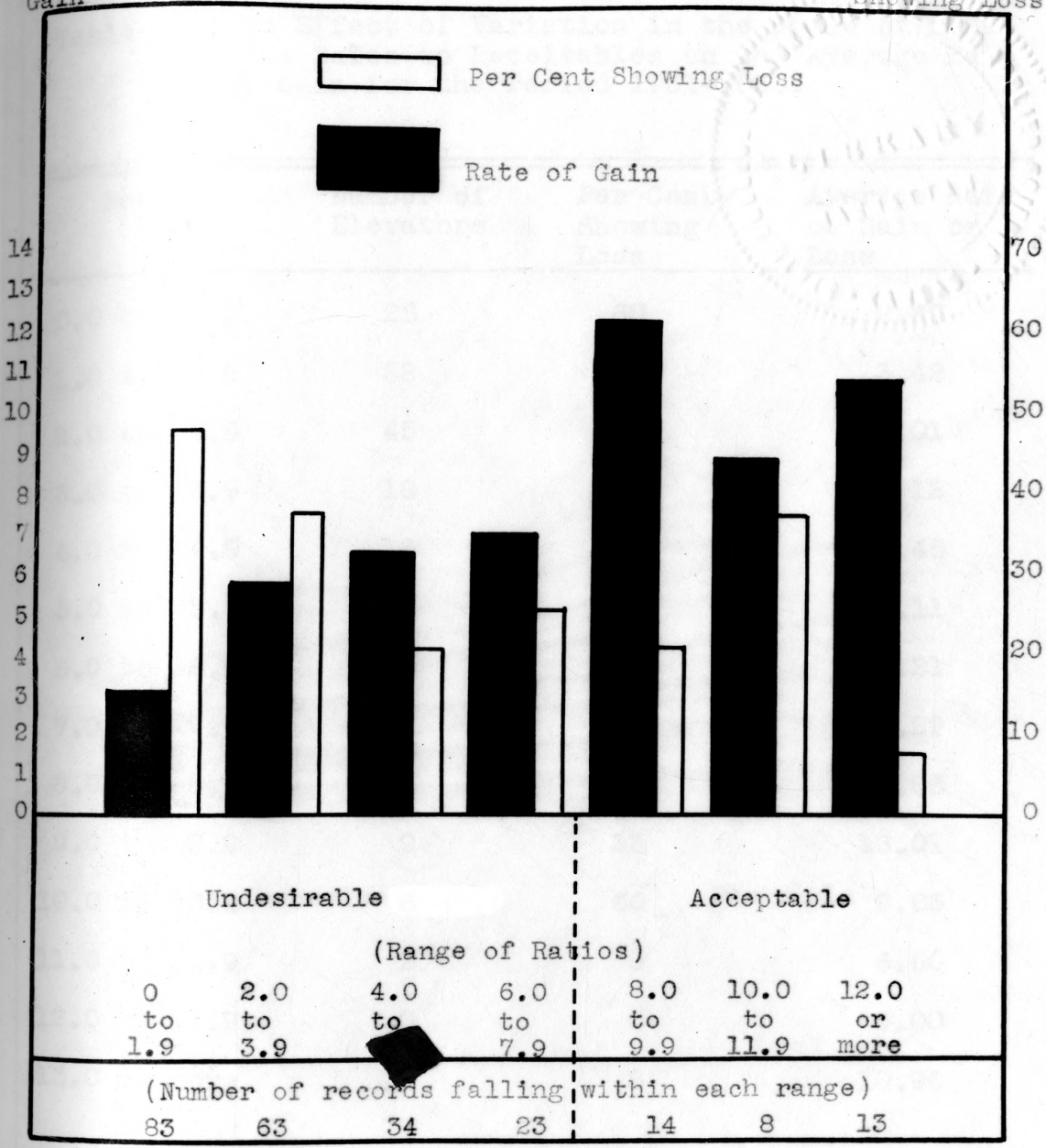portion of sales to receivables. While $8 or more in sales

Figure 5. The Effect of Variation in the Ratio of Sideline Sales to Receivables on the Average Rate of Gain on Net Worth for the Period 1931-1935.

Table 6. The Effect of Variation in the Ratio of Side-
line Sales to Receivables on the Average Rate
of Gain for the Period 1931-1935.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
0.0 to .9	25	60	2.49
1.0 to 1.9	58	43	3.42
2.0 to 2.9	45	38	6.01
3.0 to 3.9	18	39	5.12
4.0 to 4.9	16	13	9.45
5.0 to 5.9	18	28	4.11
6.0 to 6.9	12	33	3.21
7.0 to 7.9	11	18	11.29
8.0 to 8.9	5	0	5.85
9.0 to 9.9	9	33	16.01
10.0 to 10.9	6	50	9.83
11.0 to 11.9	2	0	6.50
12.0 to 12.9	0	0	0.00
13.0 or more	13	8	10.96

to each dollar of receivables may be desirable, yet with
carried over receivables included, unquestionably a higher
ratio should be recommended when the question is considered
on a strictly current basis.

Ratio of Cost of Sideline Sales to Sideline Inventory

In figuring the ratio of sideline sales to sideline
inventory, divide the cost of sideline sales by the side-
line inventory. Cost of sideline sales includes the cost
of putting into stock for sale all those goods or commodi-
ties included in the sideline business during the year.
Sideline inventories are the total dollars of inventoried
stock on hands at the time of the audit.

The purpose of comparing cost of sideline sales to
sideline inventory is to find the turnover on investment
in the sideline business.

In this study the figures for determining the ratios
were unavailable for most of the elevators previous to
1935. Of the 1935 records, 48 of the 50 elevators had
complete records for making this study and are included
in Table 7.

The elevators with $8 to $10 cost of sideline sales to
a dollar of inventory showed the highest gain and a low
per cent of those incurring a loss were in this group.

Table 7. The Effect of Variation in the Ratio of Cost
          of Sideline Sales to Sideline Inventory on
          the Average Rate of Gain on Net Worth for the
          Year 1935.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
0.0 to 1.9	1	0	.46
2.0 to 3.9	2	0	1.62
4.0 to 5.9	7	57	5.96
6.0 to 7.9	10	50	2.52
8.0 to 9.9	7	14	14.75
10.0 to 11.9	6	66	- 2.43
12.0 to 13.9	1	0	4.75
14.0 to 15.9	6	33	- .93
16.0 to 17.9	3	0	6.21
18.0 or more	5	20	12.49

However, since there was no systematic relation between the class intervals and rates of gain for varying intervals, it was impossible to show any particular range as having a group of desirable ratios. There are possibly three reasons accounting for this. They are as follows: (1) the year 1935 did not furnish a sufficient number of cases to show a desirable range, (2) the nature of the sideline business varies so much between elevators that no one range could be found as applicable to the varying phases of sideline business, and (3) that sidelines did not constitute a sufficient volume of the total business to have a close correlation to profits.

Table 7 shows that a majority of the elevators maintain a turnover of four to 12 times.

Ratio of Receivables to Current Assets

The ratio of receivables to current assets is a percentage obtained by dividing the former by the latter.

Current assets must be sufficiently liquid for any business organization to carry on its current operation with best results. The liquidity of the assets will depend on the liquidity of the items making up current assets which, in the case of the cooperative elevators, are mainly cash, receivables, and inventories.

Of all the southwestern Kansas elevators surveyed for
the years 1931 to 1935, current assets averaged $26,109.16,
$22,826.12, $22,376.93, $21,911.16, and $22,239.36, re-
spectively. Receivables averaged $11,691.65, $10,476.81,
$9,422.71, $8,163.77, and $8,677.57, respectively. Cash
averaged $5,422.31, $3,943.58, $2,937.31, $8,669.97, and
$4,217.52, respectively. It may be noted from these fig-
ures that receivables make up a large part of current as-
sets. Or, in other words, the receivables are important
in determining the liquidity of current assets which makes
it pertinent to know the relationship. A greater compara-
tive amount of receivables tends to weaken the working
capital position. Many cooperative elevator associations
would like to divert a considerable part of their receiv-
ables to inventory or cash.

In Table 8 the first five deciles have an actual ratio
of less than 40.6 per cent for each year and in only four
of the 25 deciles is an average rate of loss shown. In
the latter five deciles where a greater part of current
assets is made up of receivables there are nine of 25
deciles where an average loss is shown. In general the
latter mentioned decile groups show a much smaller average
rate of gain.

By a frequency study method in chart form with class

Table 8. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Receivables to Current Assets.

| | 1931 | | | 1932 | | | | 1933 | | | | 1934 | | | | 1935 | | | |
Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss	Actual Range	No. Show-ing Gain	No. Show-ing Loss	Average Rate of Gain or Loss
2.8 / 10.1	5	0	19.63	2.5 / 13.9	4	1	4.87	3.1 / 11.3	3	2	4.70	2.7 / 5.0	5	0	6.49	2.6 / 6.0	4	1	9.18
13.9 / 23.6	4	1	18.77	16.1 / 21.6	2	3	- 2.03	12.2 / 15.1	4	1	8.84	9.4 / 14.6	4	1	16.22	7.0 / 14.6	4	1	8.27
25.0 / 29.1	2	3	- 1.68	24.0 / 27.1	5	0	20.04	20.0 / 24.0	3	2	- 2.25	14.9 / 18.7	3	2	3.57	15.0 / 20.0	3	2	13.28
30.8 / 36.2	5	0	12.32	27.5 / 34.2	2	3	4.99	24.2 / 27.8	3	2	13.24	20.6 / 31.0	5	0	7.72	21.0 / 30.8	5	0	12.12
37.4 / 40.6	5	0	21.07	36.4 / 42.2	2	3	- .47	33.3 / 36.1	5	0	4.33	32.2 / 37.0	3	2	1.46	31.9 / 37.0	3	2	5.60
43.5 / 47.1	3	2	- 5.17	45.6 / 48.4	3	2	- .13	37.4 / 47.0	2	3	- .47	37.4 / 38.7	4	1	3.65	37.7 / 46.0	3	2	.38
47.7 / 56.0	4	1	19.92	49.6 / 57.6	3	2	9.09	49.4 / 52.3	3	2	3.95	39.1 / 46.1	2	3	1.76	47.3 / 48.9	1	4	- 6.20
56.5 / 58.8	5	0	23.18	58.8 / 64.3	1	4	.15	52.8 / 59.8	2	3	2.15	46.7 / 51.1	2	3	.41	49.7 / 51.5	4	1	2.60
59.3 / 66.3	3	2	13.93	66.1 / 74.5	4	1	.77	60.9 / 68.0	1	4	- 3.02	54.8 / 66.0	1	4	- 3.38	51.5 / 55.8	3	2	4.04
66.6 / 84.0	4	1	14.37	76.5 / 90.6	2	3	- .76	72.8 / 80.4	1	4	-36.88	67.5 / 73.3	1	4	- 2.71	60.2 / 75.3	3	2	.81

intervals of 10 per cent, Figure 6 shows the change in average rates of gain and change in per cent of those showing loss as the class interval changes.

Elevators with the least chance of showing a loss occurred in the interval where no more than 10 per cent of current assets is tied up in receivables. In all intervals where the ratio is less than 40 per cent, a smaller per cent of the elevators showed a loss than when the receivables represented more than 40 per cent of current assets. The most desirable ranges, as far as gain on net worth is concerned, occurred in the intervals with less than a 40 per cent ratio. There are no two intervals above the 40 per cent range having as large a gain as any two below 40 per cent. Figure 6 shows a ratio of 40 per cent or above to be undesirable. Ratios above this amount must be termed undesirable since the probability of loss is high. Any range below 40 per cent may be termed desirable or acceptable. Whether or not ratios in any of these ranges may be termed desirable, acceptable, or undesirable, will depend on the condition or collectibility of receivables.
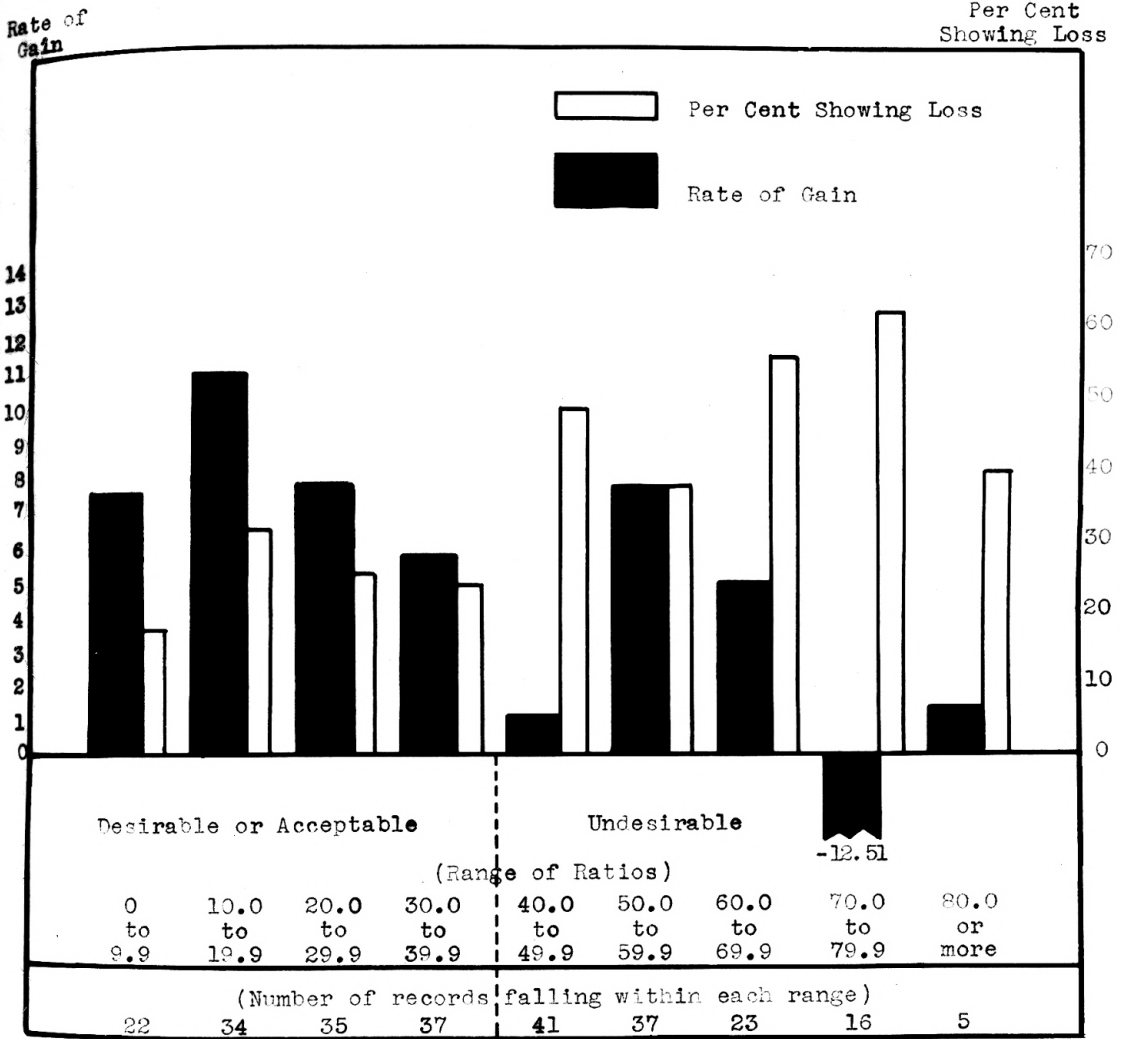
Rate of
Gain

Figure 6.   The Effect of Variation in the Ratio of Receivables to
Current Assets on the Average Rate of Gain on Net Worth
for the Period 1931-1935.

FIXED CAPITAL ANALYSIS

Ratio of Total Sales to Net Fixed Assets

The ratio of total sales to net fixed assets is fig-
ured by dividing the total sales by net fixed assets or
fixed assets less reserve for depreciation. Total sales
include all sales such as wheat sales, other grain sales,
and sideline sales.

This comparison helps to determine the number of dol-
lars of sales necessary, for each dollar invested in fixed
assets, to yield reasonable earnings above the fixed and
operating cost.

Table 9 shows the annual actual range, the number
showing a gain or loss, and the average rate of gain or
loss by decile groups. In only one decile group was there
an average rate of loss where the actual range was above
6.32.

Figure 7, as in the case of the other bar charts,
shows the effect of variation of the ratio of sales to
fixed assets or the rate of gain on net worth. More than
half the elevators showed a loss where sales were less than
six times the fixed assets. The same thing was true even
where the sales were less than eight times the amount of

Table 9. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Total Sales to Net Fixed Assets.

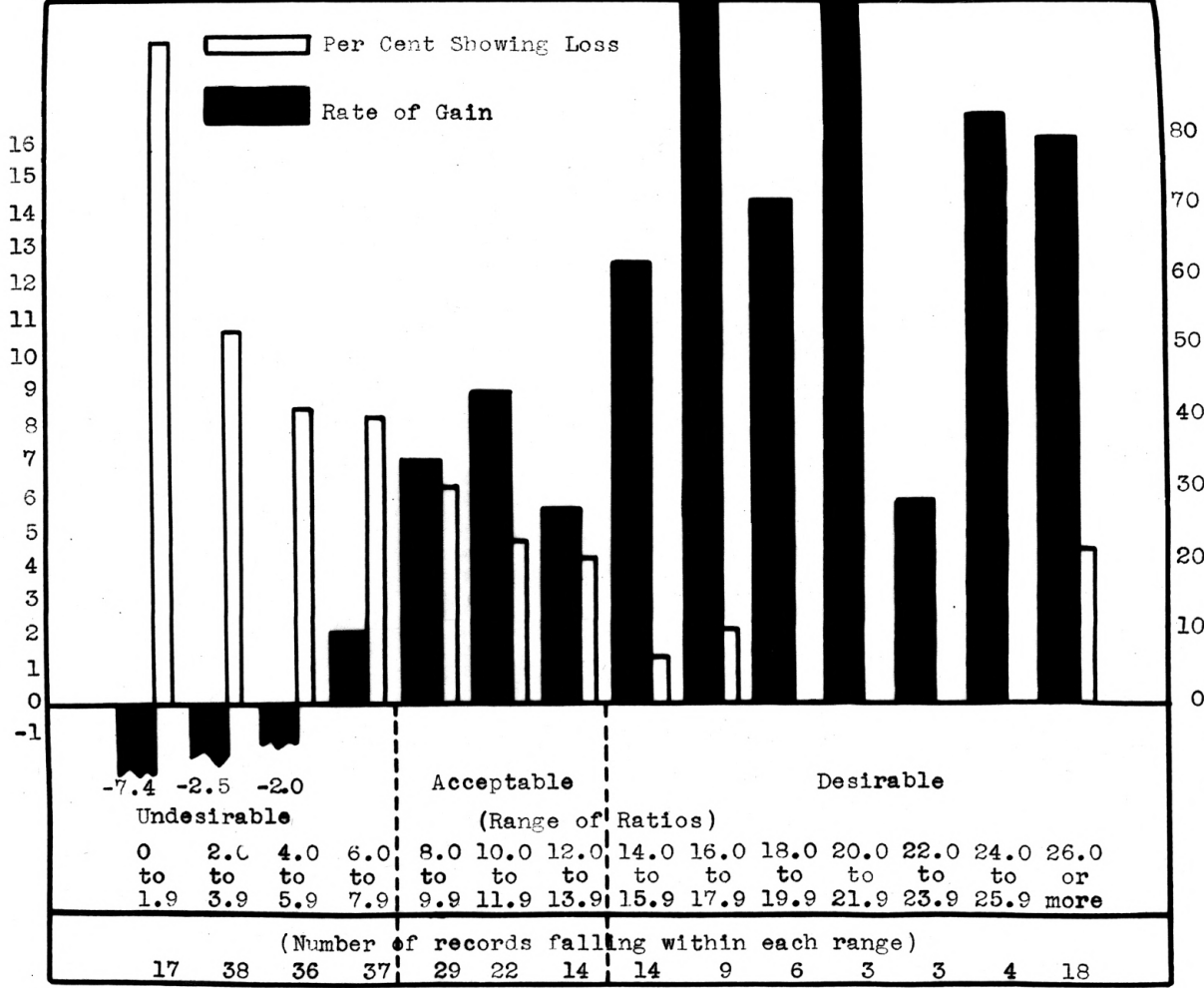|	1931				1932				1933				1934				1935		
Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
3.03 / 4.70	3	2	2.52	.94 / 1.97	0	5	-12.25	.55 / 1.99	0	5	- 7.18	1.52 / 2.47	2	3	- 2.77	.31 / 1.94	1	4	- 2.89
5.09 / 6.20	4	1	7.77	2.62 / 3.70	3	2	4.08	2.07 / 2.45	2	3	- .70	2.51 / 3.59	2	3	- 2.36	2.56 / 2.86	3	2	2.27
6.25 / 7.99	4	1	5.01	3.84 / 4.49	1	4	- 6.79	2.46 / 3.66	2	3	- .93	3.68 / 4.44	1	4	- 7.07	2.92 / 5.30	4	1	.06
8.10 / 9.12	4	1	12.59	4.67 / 5.13	3	2	2.12	3.67 / 5.60	1	4	-36.10	5.11 / 6.32	2	3	- 1.30	5.31 / 6.66	4	1	.86
9.36 / 10.21	2	3	3.12	5.39 / 6.15	3	2	1.18	5.74 / 6.82	3	2	3.86	7.22 / 8.76	2	3	2.23	6.68 / 9.79	2	3	.40
10.21 / 11.55	4	1	12.68	6.54 / 7.71	1	4	- 1.25	6.84 / 7.30	4	1	2.66	8.81 / 10.76	3	2	4.12	9.89 / 12.50	3	2	.26
11.63 / 12.13	4	1	10.35	7.97 / 8.54	4	1	10.61	7.30 / 7.72	3	2	4.61	10.97 / 13.44	4	1	5.19	13.10 / 14.89	5	0	7.71
12.56 / 16.04	5	0	13.78	8.68 / 11.45	4	1	6.82	7.73 / 9.89	4	1	6.86	13.79 / 22.15	5	0	8.11	15.36 / 17.33	3	2	7.67
16.21 / 21.61	5	0	39.08	13.56 / 15.75	4	1	18.22	10.29 / 12.79	4	1	9.51	22.87 / 26.21	5	0	7.97	18.52 / 29.78	5	0	28.69
21.68 / 46.53	5	0	29.44	15.87 / 29.70	5	0	11.59	12.95 / 33.89	4	1	11.99	26.60 / 56.99	4	1	21.08	30.37 / 69.83	3	2	5.07

Figure 7. The Effect of Variation in the Ratio of **Total Sales to Net** Fixed Assets on the Average Rate of Gain on Net Worth **for** the Period 1931-1935.

fixed assets. However, those elevators having a ratio of 6.0 to 7.9 averaged a slight gain, but 41 per cent still showed a loss. Records showing a range of 8.0 to 12.0 showed acceptable results or rather consistent earnings, with a much smaller per cent showing losses. However, the records or range of desirable ratios showing the highest rate of gain, maintained sales at about 15 times the fixed assets. Where the ratio is above 10.0, the probability of incurring a loss is only about one in five.

In the analysis made by Green and Rucker, $8 in sales to each dollar in fixed assets was used as a desirable ratio.

Ratio of Net Worth to Net Fixed Assets

The ratio of net worth to net fixed assets is computed by dividing net worth by net fixed assets. In net worth is included mainly such items as outstanding stock, stock credits, surplus, and proprietorship reserves. In net fixed assets are included the same items as mentioned in the preceding comparison.

The comparison of net worth to fixed assets is intended to tell whether or not fixed assets are over expanded. If the ratio should be found to decrease from period to period for an individual association, it may mean there is

too large a proportion of the net worth invested in fixed assets. This fault would be more apt to occur in the older associations.

According to Rucker, 35 southwestern Kansas elevators handled an average of 453,857 bushels of grain in 1931, 317,519 bushels in 1932, 221,305 bushels in 1933, and 264,147 bushels in 1934. From these figures it would not be expected that southwestern Kansas elevators would have reason to do much expanding in fixed assets for the years immediately following 1931 since there was decreasing volume of grain handled. Then, a year to year narrowing of net worth as compared to fixed assets could, in general, be attributed to decreasing net worths due to losses through small volumes of grain.

Table 10 shows, however, that the ratio of net worth to fixed assets narrowed only for those elevators whose ratio placed them in the lower two or three deciles. In other words, associations whose ratio rating placed them in the upper two or three deciles were less able to withstand the adverse years of low grain volume following 1931 and maintain the same proportion of net worth to fixed assets. All the upper deciles of Table 10 during these years maintained a rather constant proportion of net worth to fixed assets.

Table 10. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Net Worth to Fixed Assets.

	1931				1932				1933				1934				1935		
Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
.69 / 1.02	4	1	9.59	.71 / .95	1	4	-15.37	- .49 / .86	0	5	-40.89	.46 / .82	1	4	-11.40	.51 / .80	3	2	- .84
1.05 / 1.16	3	2	10.64	1.06 / 1.30	1	4	1.30	1.02 / 1.24	1	4	- 4.41	1.13 / 1.17	1	4	- 3.47	.82 / 1.18	2	3	- 1.12
1.20 / 1.47	4	1	6.97	1.32 / 1.45	3	2	3.40	1.27 / 1.49	4	1	5.41	1.17 / 1.44	2	3	- .99	1.20 / 1.47	3	2	1.16
1.49 / 1.70	4	1	15.70	1.64 / 1.72	4	1	3.41	1.55 / 1.65	2	3	1.29	1.52 / 1.69	3	2	5.85	1.49 / 1.76	1	4	- 1.79
1.75 / 1.93	3	2	7.23	1.72 / 1.99	3	2	4.55	1.69 / 1.94	4	1	5.26	1.79 / 1.87	4	1	6.05	1.79 / 1.85	3	2	2.38
1.94 / 2.15	5	0	13.91	2.06 / 2.18	3	2	8.32	1.98 / 2.28	2	3	.78	1.96 / 2.22	3	2	4.73	1.90 / 2.06	3	2	1.90
2.28 / 2.60	5	0	29.68	2.37 / 2.69	1	4	.15	2.30 / 2.49	3	2	4.29	2.27 / 2.49	3	2	5.06	2.24 / 2.46	5	0	20.53
2.62 / 2.79	4	1	13.98	2.82 / 3.15	3	2	14.16	2.77 / 3.06	2	3	11.06	2.52 / 2.99	4	1	17.44	2.53 / 2.98	4	1	12.38
3.14 / 3.53	5	0	24.96	3.24 / 3.76	4	1	4.09	3.22 / 3.46	5	0	4.36	3.23 / 4.15	4	1	4.27	3.01 / 3.98	5	0	7.86
3.66 / 4.75	3	2	3.70	3.82 / 5.22	5	0	10.30	3.73 / 5.81	4	1	7.43	4.62 / 6.53	5	0	7.65	4.33 / 6.38	4	1	7.62

Figure 8 shows those associations with a ratio of less than 1.25 to have a high probability of showing a loss. Of the 28 records falling within the range of from 1.0 to 1.24, 75 per cent showed a loss and the entire 28 cases had an average rate of loss of 2.26 per cent. In those ranges where the ratios were above 1.25, or where the intermediate ranges were between 1.25 to 2.50, the probability of loss in all ranges was below 50 per cent and they averaged reasonable rates of gain.

Figure 8 places the ratios, where net worth is $2.50 to $3.99 for each dollar of fixed assets, in the desirable range since the probability of loss in these ranges is comparatively low and the rates of gain are high. Acceptable results are shown when net worth is $1.25 or more as compared to fixed assets. Less than $1.25 of net worth for each dollar of fixed assets is undesirable since in every interval there was an average rate of loss and practically all elevators in this group experienced rather heavy losses.

Ratio of Fixed Assets to Fixed Liabilities

This ratio is figured by dividing the net fixed assets by the long term indebtedness. In general all those debts falling due later than 12 months from the date of the

Rate of Gain — Per Cent Showing Loss

22.5

Legend: □ Per Cent Showing Loss ■ Rate of Gain

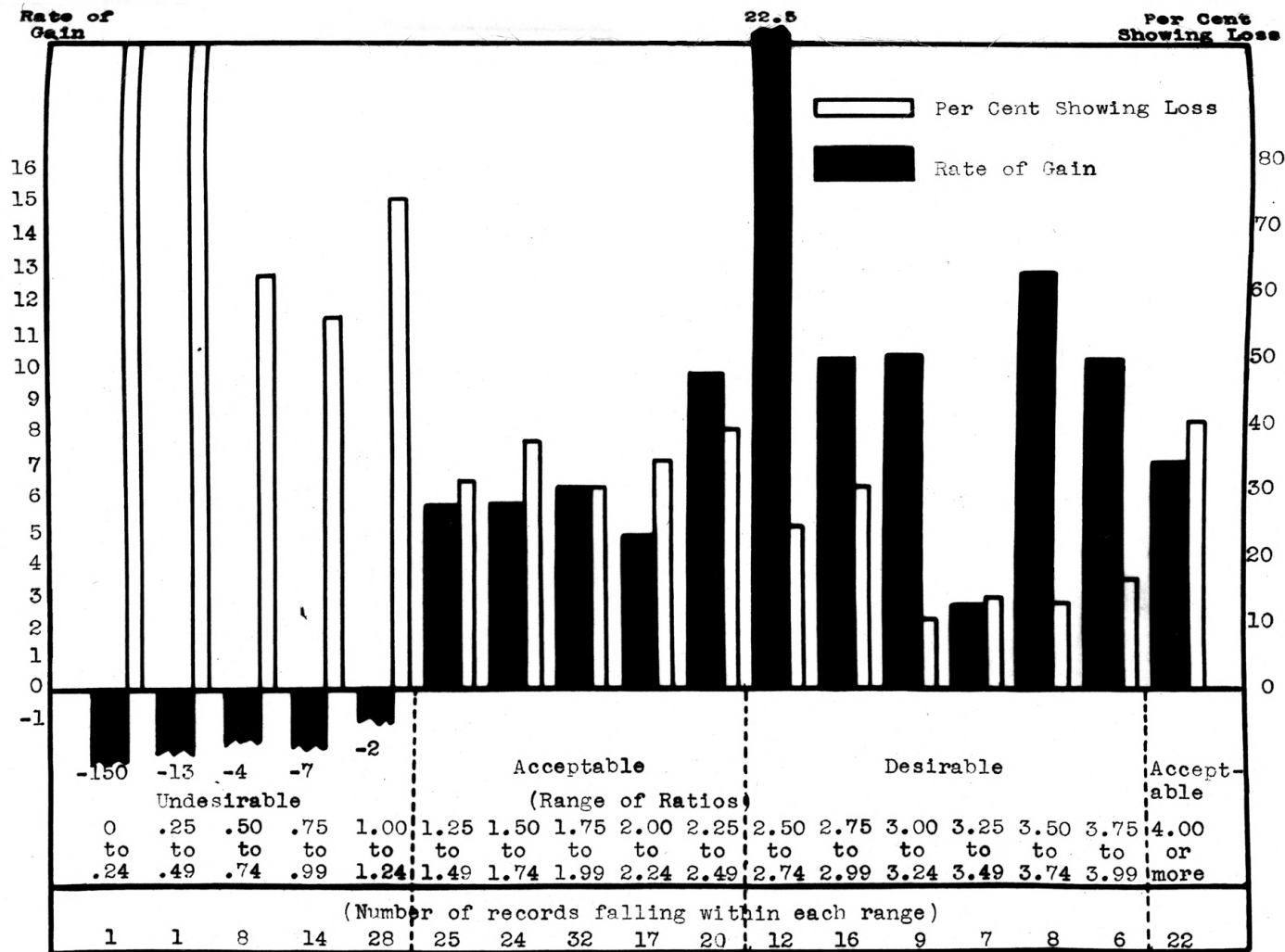		Undesirable				Acceptable (Range of Ratios)					Desirable						Acceptable
Rate of Gain	-150	-13	-4	-7	-2												
Range of Ratios	0 to .24	.25 to .49	.50 to .74	.75 to .99	1.00 to 1.24	1.25 to 1.49	1.50 to 1.74	1.75 to 1.99	2.00 to 2.24	2.25 to 2.49	2.50 to 2.74	2.75 to 2.99	3.00 to 3.24	3.25 to 3.49	3.50 to 3.74	3.75 to 3.99	4.00 or more
(Number of records falling within each range)	1	1	8	14	28	25	24	32	17	20	12	16	9	7	8	6	22

Figure 8.   The Effect of Variation in the Ratio of Net Worth to Net Fixed Assets on the Average Rate of Gain on Net Worth for the Period 1931-1935.

audit are included in fixed liabilities.

The ratio of fixed assets to fixed debt, in most cases, determines the amount of funds that may be borrowed on the fixed capital. It has long been the bankers rule-of-thumb method to lend up to about 50 per cent of the value of the fixed assets. Table 11 shows this fact very well since in none of the 250 records was there a case where more than 78 cents long term debt was borrowed for each dollar of fixed assets. In only 13 out of the 250 cases had as much as 50 per cent of the value of fixed assets been loaned. Because of these facts, it could not be expected that the amount of fixed liabilities would be a limiting factor in rate of gain. However, it may be noted from Table 11 that the elevators with no fixed liabilities showed higher rates of gain on net worth than the elevators carrying fixed liabilities.

Green's and Rucker's standard calls for two dollars in fixed assets for each dollar of fixed debt. Below this amount might well be termed an undesirable standard and a desirable standard to be more than $2 of fixed assets for each dollar of fixed debt.

Table 11. The Effect of Variation in the Ratio of
Fixed Assets to Fixed Liabilities on the
Average Rate of Gain on Net Worth for the
Period 1931-1935.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
0.0 to .9	0	0	0.00
1.0 to 1.9	13	54	2.66
2.0 to 2.9	18	61	1.14
3.0 to 3.9	5	60	- 3.37
4.0 to 4.9	4	50	4.96
5.0 to 5.9	5	60	-13.16
6.0 to 6.9	5	20	4.27
7.0 or more	200	33	6.19

ANALYSIS OF CAPITALIZATION SITUATION

Ratio of Surplus to Outstanding Stock

This ratio is derived by dividing the surplus by the outstanding stock. The amount of surplus in proportion to the outstanding stock is one indication of how the working capital is being provided. It is generally accepted that business concerns which provide their working capital funds mainly through surplus, are in a better or stronger financial position than where these funds are provided through liabilities, capital stock, or otherwise.

Hall states, "The most successful elevators tend to provide their capital as follows: Less than 5 per cent of their total capital is provided by borrowed capital, less than 30 per cent of total capital is provided by capital stock, and 65 per cent or more of total capital is provided for by surplus." As previously stated, Hall found the more successful organizations to have two dollars or more of surplus for each dollar of capital stock. However, his conclusion was based on a study in which all prorates and stockholder dividends were included in surplus.

The amount of surplus to outstanding stock also is an indication of what the organization has been doing in the

way of accumulating working capital funds through earnings.
Green and Rucker recommend one dollar in surplus back of
each dollar of capital stock and on this study the Exten-
sion Service recommendations have been based.

Table 12 simply makes a study of what the ratio has
been by years. It may be noted that there has not been a
material change in the ratios from one year to another for
the elevators as a whole, except that those occurring in
the lower three deciles have tended to weaken or lower their
ratio during the depression years of 1932, 1933, 1934, and
1935, whereas the higher decile groups have tended to main-
tain a more constant ratio of surplus to stock during those
years.

Figure 9 shows the 250 records on a frequency basis
with class intervals of four-tenths. From this chart it
may be observed that associations having less than 40 cents
surplus per dollar of outstanding stock are in the unde-
sirable range and in danger of showing a loss since 55 per
cent of 66 cases did and had an average rate of loss on
net worth of 2.28 per cent. The most desirable range or
highest rates of gain are found among the intervals having
more than two dollars in surplus to stock and they show
the least probability of incurring a loss. Of 30 records
with a ratio above 3.60, only 27 per cent showed a loss

Table 12. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Surplus to Outstanding Stock.

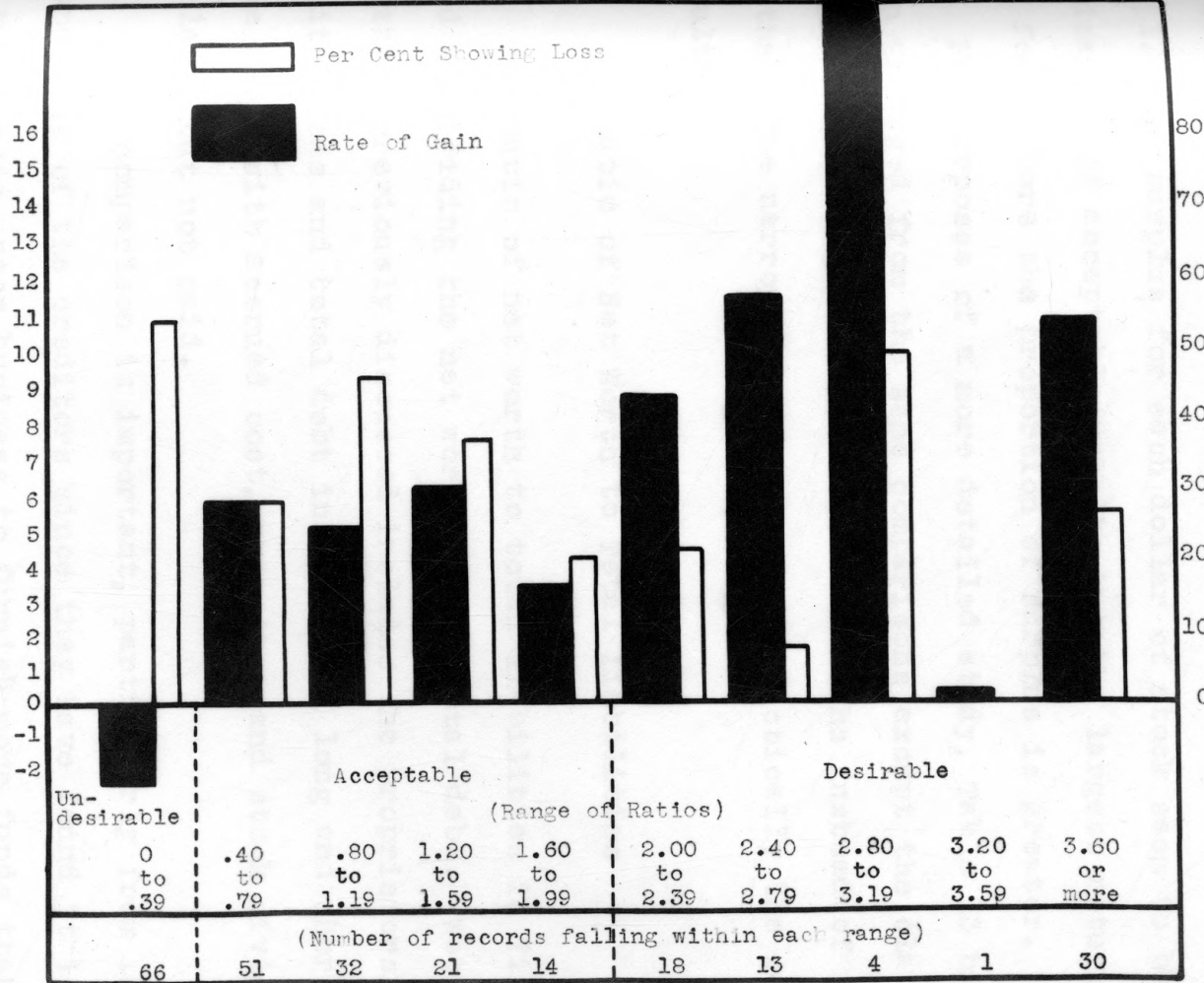| 1931 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1932 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1933 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1934 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1935 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
-.01 .18	5	0	13.37	-.12 .17	2	3	-5.10	-1.39 .12	2	3	-35.07	-.39 -.02	0	5	-12.26	-.38 -.06	1	4	-8.23
.19 .39	4	1	13.72	.17 .30	1	4	-1.73	.12 .22	3	2	-2.12	.04 .20	4	1	2.88	.01 .15	3	2	5.22
.39 .58	2	3	5.14	.33 .45	2	3	.86	.22 .43	3	2	.82	.22 .39	1	4	-.35	.17 .36	2	3	1.65
.59 .63	4	1	5.11	.45 .56	4	1	.17	.44 .54	2	3	.70	.49 .60	4	1	8.55	.40 .54	4	1	4.26
.86 1.00	3	2	8.93	.62 .91	1	4	-1.53	.56 .93	4	1	8.19	.60 .72	5	0	8.85	.67 .79	5	0	16.91
1.04 1.30	5	0	24.46	.99 1.30	4	1	8.73	.98 1.07	1	4	-1.67	.87 1.03	1	4	-3.05	.83 .96	2	3	.01
1.39 1.51	3	2	6.56	1.31 1.64	3	2	5.26	1.11 1.66	2	3	2.51	1.13 1.67	4	1	7.01	1.20 1.61	4	1	3.15
1.51 2.30	5	0	12.55	1.93 2.25	5	0	8.07	1.69 2.36	3	2	3.76	1.71 2.33	4	1	3.73	1.68 2.38	4	1	8.42
2.40 3.63	5	0	29.24	2.35 3.64	4	1	14.32	2.54 3.78	4	1	15.66	2.39 3.71	3	2	11.89	2.40 3.56	4	1	18.65
4.19 9.27	4	1	17.27	4.27 8.79	3	2	5.27	3.95 11.22	3	2	1.80	3.90 9.13	4	1	7.94	4.13 7.77	4	1	.03

Figure 9. The Effect of Variation in the Ratio of Surplus to Outstanding Stock on the Average Rate of Gain on Net Worth for the Period 1931-1935.

and the average rate of gain on net worth was 10.96 per
cent.   This indicates that at present southwestern Kansas
elevators as a whole have not set aside sufficient amounts
of earnings in surplus.   Ratios representing from $0.40
to $1.99 of surplus for each dollar of stock seem to be
indicative of acceptable results but the largest returns
are found where the proportion of surplus is greater.

For purposes of a more detailed study, Table 13 has
been arranged from the same comparisons except the class
intervals have been narrowed to two-tenths instead of four-
tenths.   The narrower interval shows practically the same
results.

Ratio of Net Worth to Total Liabilities

The ratio of net worth to total liabilities is fig-
ured by dividing the net worth by the total debt.   Net
worth as previously discussed includes the proprietorship
equity items and total debt includes all long and short
time debts with accrued cost, prorates, and stock dividends
declared but not paid.

This comparison is important, particularly from the
standpoint of the creditors since they have found it is,
in most cases, poor business to furnish more funds than is
furnished by the owners themselves.   This is one of the

Table 13. The Effect of Variation in the Ratio of
Surplus to Outstanding Stock on the Average
Rate of Gain on Net Worth for the Period
1931-1935.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
.00 to .19	41	49	- 4.26
.20 to .39	25	64	.96
.40 to .59	31	35	4.86
.60 to .79	20	20	7.16
.80 to .99	17	53	3.03
1.00 to 1.19	15	40	7.24
1.20 to 1.39	10	50	5.24
1.40 to 1.59	11	27	7.09
1.60 to 1.79	12	17	3.89
1.80 to 1.99	2	50	.27
2.00 to 2.19	7	43	8.36
2.20 to 2.39	11	9	9.04
2.40 to 2.59	8	0	13.33
2.60 to 2.79	5	20	8.94
2.80 to 2.99	2	100	- 4.68
3.00 to 3.19	2	0	70.80
3.20 to 3.39	0	0	0.00
3.40 to 3.59	1	0	.32
3.60 to 3.79	5	20	33.45
3.80 or more	25	28	6.46

more important comparisons from the standpoint of the financial stability. It compares the owned and borrowed capital.

In 1931, from Table 14, it appears that the elevators with a ratio of from .61 to 4.25 experienced the largest rate of gain. However, in the upper decile where the actual range was .61 to 1.25 only two of the five were below 1.0 and one of the two lost money. During this year of large grain volume, elevators with a ratio above 4.25 had no comparative advantage and actually showed less earnings than the lower groups. In 1932, a year of smaller grain volume, there is a bi-modal distribution of gain. Both groups range between 1.90 and 7.00. In 1933, 1934, and 1935, the only deciles in which there occurs an average loss is found in the lower three. The highest average gain occurred in the next higher three deciles.

Figure 10 is a study of 179 records of the ratios below 10. In the five year summary chart the possibility of showing a loss is greater and the average rates of loss are larger when the ratio is less than 1.0. Elevators with less than one dollar of net worth for each dollar of liabilities are therefore classed in the undesirable range. Ratios falling in the range between 1.00 and 3.49 seem to be indicative of acceptable results as far as earnings on

Table 14. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Net Worth to Total Liabilities.

Actual Range	1931			1932				1933				1934				1935			
	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
.61 / 1.25	4	1	19.99	.63 / 1.63	1	4	- 6.72	- .18 / 1.24	0	5	-39.78	.45 / 1.21	0	5	-10.72	.50 / 1.13	3	2	- .13
1.27 / 1.57	4	1	21.26	1.90 / 2.15	5	0	16.76	1.32 / 2.22	2	3	6.16	1.25 / 2.08	2	3	8.88	1.14 / 1.76	1	4	9.39
1.81 / 2.43	5	0	28.57	2.17 / 2.65	2	3	1.03	2.37 / 2.63	1	4	- 5.22	2.22 / 2.85	0	5	- 3.33	1.77 / 2.62	2	3	- .58
2.63 / 2.80	4	1	16.32	2.67 / 3.12	1	4	-11.61	2.77 / 3.53	3	2	6.30	2.93 / 3.56	3	2	.06	2.84 / 3.58	4	1	3.52
2.87 / 3.69	4	1	17.16	3.34 / 4.91	5	0	15.90	4.27 / 5.42	4	1	10.01	4.47 / 5.27	5	0	12.22	3.78 / 5.21	4	1	3.94
3.80 / 4.25	5	0	15.74	4.96 / 6.98	5	0	14.43	5.51 / 7.49	3	2	4.52	5.66 / 7.40	3	2	6.82	5.24 / 6.98	4	1	4.64
4.26 / 5.29	3	2	9.70	7.00 / 9.20	3	2	2.40	7.55 / 11.15	5	0	8.29	7.52 / 9.67	4	1	4.44	7.17 / 11.13	3	2	1.33
5.87 / 8.88	4	1	.80	9.39 / 18.11	3	2	3.57	12.16 / 18.14	2	3	1.60	9.73 / 23.58	5	0	6.10	11.84 / 18.68	5	0	5.59
9.98 / 18.15	4	1	4.35	19.37 / 40.03	0	5	- 4.90	21.94 / 92.57	4	1	1.65	23.82 / 96.05	4	1	5.03	19.43 / 71.62	5	0	8.26
19.34 / 221.59	3	2	2.52	112.35 / 310.96	4	1	3.46	312.80 / 671.00	3	2	1.04	242.20 / No L.	4	1	5.70	213.82 / No L.	2	3	.02

Rate of Gain | Per Cent Showing Loss

□ Per Cent Showing Loss
■ Rate of Gain

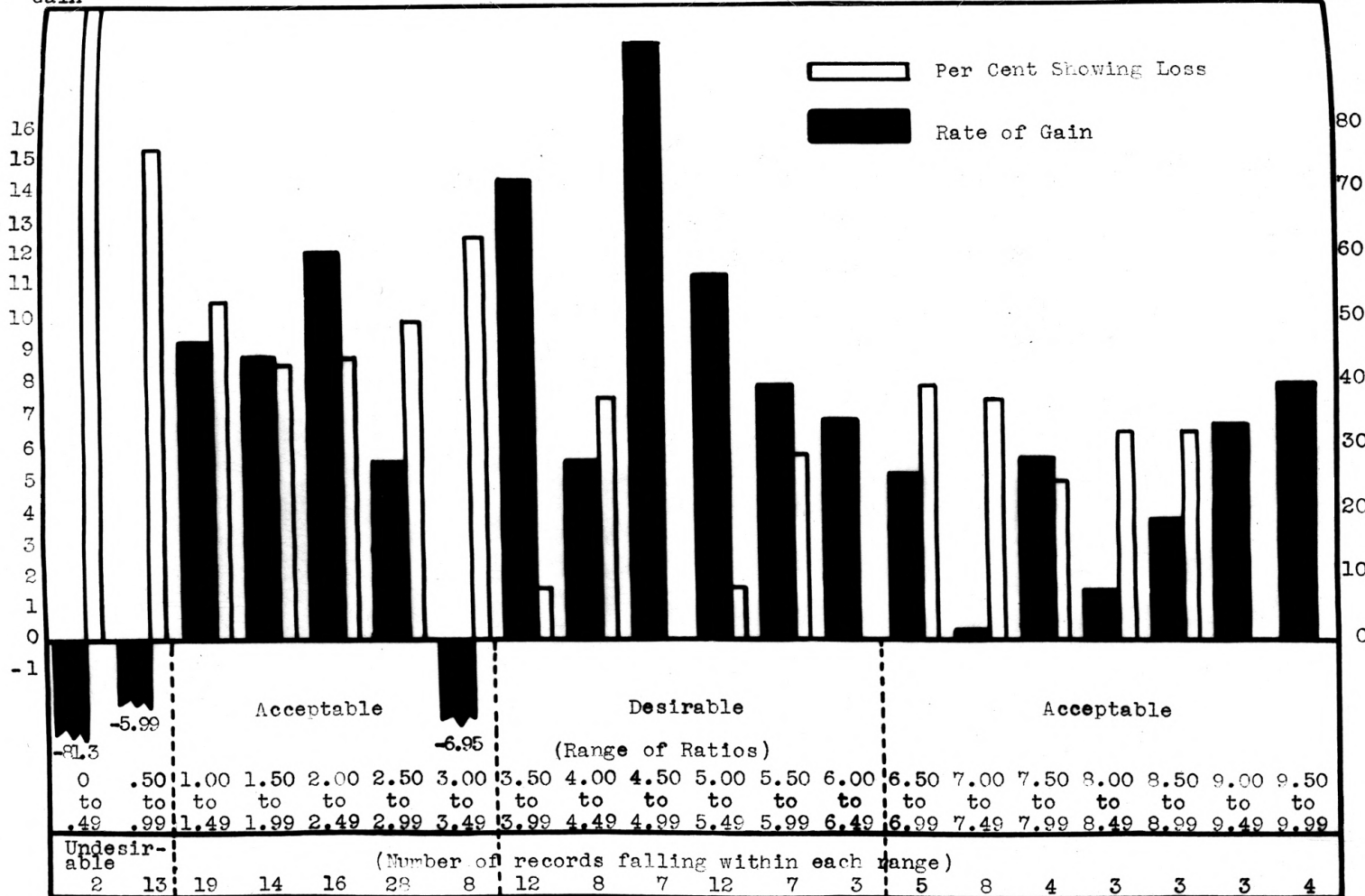			Acceptable					Desirable (Range of Ratios)						Acceptable						
0 to .49	.50 to .99	1.00 to 1.49	1.50 to 1.99	2.00 to 2.49	2.50 to 2.99	3.00 to 3.49	3.50 to 3.99	4.00 to 4.49	4.50 to 4.99	5.00 to 5.49	5.50 to 5.99	6.00 to 6.49	6.50 to 6.99	7.00 to 7.49	7.50 to 7.99	8.00 to 8.49	8.50 to 8.99	9.00 to 9.49	9.50 to 9.99
Undesirable						(Number of records falling within each range)													
2	13	19	14	16	28	8	12	8	7	12	7	3	5	8	4	3	3	3	4

−8.3
−5.99
−6.95

Figure 10. The Effect of Variation in the Ratio of Net Worth to Total Liabilities on the Average Rate of Gain on Net Worth for the Period 1931-1935.

net worth is concerned. In this grouping appreciable earnings have been shown, but since, in general, elevators in this range have shown a comparatively large number of losses, it becomes unwise to place them in the desirable group. Where the ratios range from 3.50 to 6.49 the rates of gain are highest and the percentage of those showing a loss is distinctly less than for any other range or group of ranges. Because of this fact, elevators having $3.50 to $6.49 of net worth for each dollar of debt are in the desirable range. Where the ratios are above 6.49 no especial advantage is shown and the ratios have been classed as acceptable.

Supplementary to Figure 10 is Table 15 which makes a frequency study of 71 cases where the class interval is above 10.0. It is evident from this table that the cooperative elevator associations, with an extremely high ratio of net worth to debt, show no greater gains and the probability of loss is not lessened.

ANALYSIS OF FINANCIAL RESULTS OF OPERATION

Net Earning in Per Cent of Sales

The net earning in per cent of total sales is found by dividing the earning by the sales. Net earning is the difference between total cost of sales and total sales less

Table 15. The Effect of Variation in the Ratio of Net
           Worth to Total Liabilities on the Average
           Rate of Gain on Net Worth for the Period
           1931-1935.

Range		Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
10.0 to	29.9	40	30	2.11
30.0 to	49.9	5	20	4.06
50.0 to	69.9	0	0	0.00
70.0 to	89.9	2	50	5.20
90.0 to	109.9	2	100	- 2.33
110.0 to	129.9	1	0	14.52
130.0 to	149.9	0	0	0.00
150.0 to	169.9	1	0	5.55
170.0 to	189.9	0	0	0.00
190.0 or more		20	35	2.09

the operating expense. Net earnings do not include other income since other income does not come about as a direct result of operations.

This ratio tells the per cent of each dollar of sales which is represented by the net earning of the association. It is from the net earnings that stock dividends and prorations are paid and collections made to surplus. For this reason it becomes the aim of every cooperative to protect a margin of income above all operation costs to show earnings for prorations, stock dividends, and to build up surplus.

Table 16, in which the actual range or per cent of earning is compared to the rate of gain by decile grouping, shows almost a direct correlation between the two on an annual basis. The upper deciles show the heaviest loss and the lower deciles show the largest gain. In the four lower deciles for each of the five years, there are 100 cases with not one of the hundred showing a loss.

In Figure 11, 76 per cent of 120 records show a loss when no margin at all was maintained on per dollar sales basis. In other words, 24 per cent of the 120 did show an earning on net worth. Since the earning was not made on per dollar sales basis, other income must account for the earnings of the 24 per cent which is an indication of

Table 16. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Per Cent Net Earning is of Total Sales.

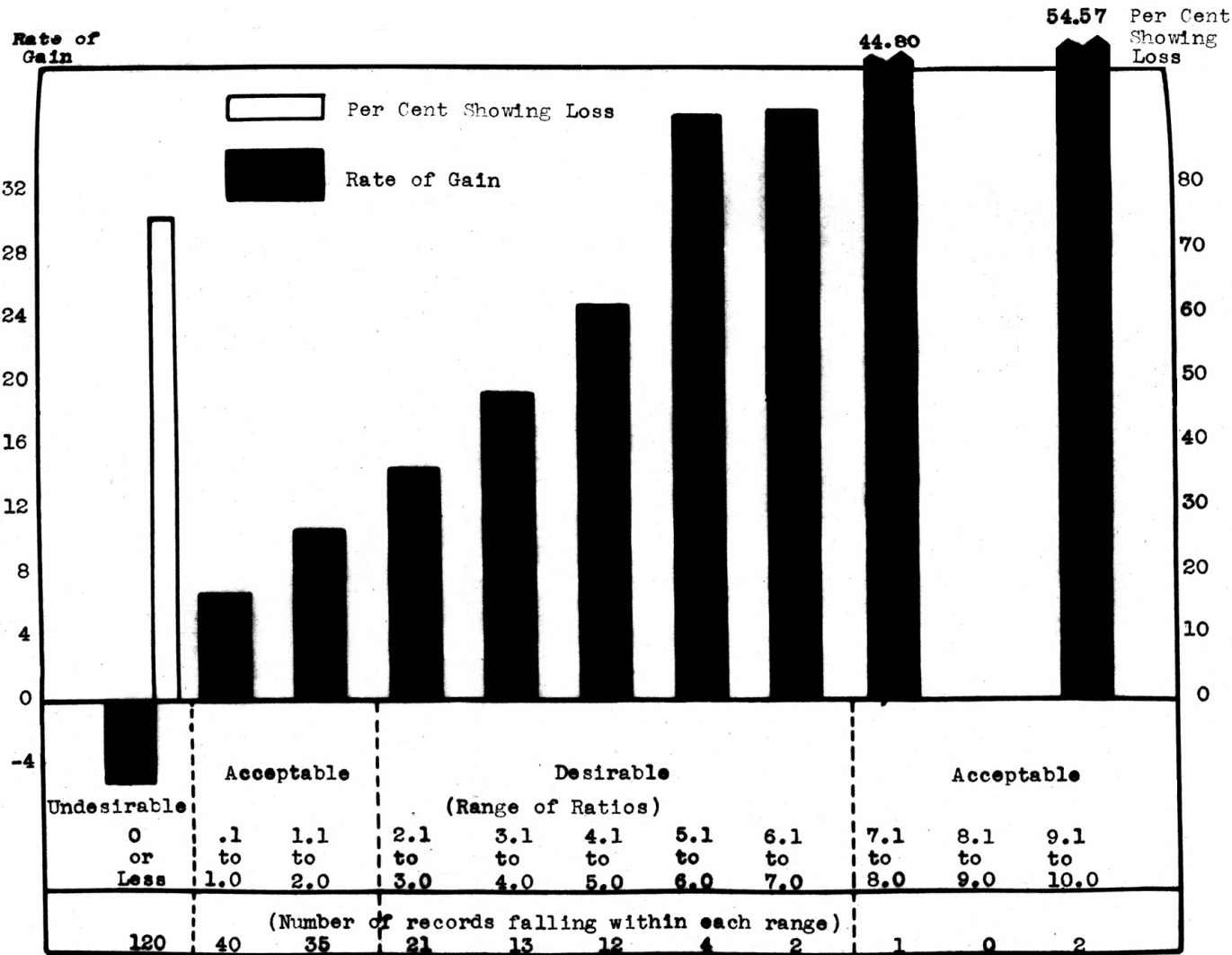| | 1931 | | | | 1932 | | | | 1933 | | | | 1934 | | | | 1935 | | |
Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
-10.0 / - 2.2	0	5	-10.74	-18.8 / - 7.7	0	5	-20.97	-16.7 / - 8.6	0	5	-37.09	- 7.8 / - 4.2	0	5	-13.27	-54.3 / - 4.7	0	5	- 6.47
- 2.2 / - .4	1	4	- 1.04	- 7.4 / - 4.0	0	5	- 2.83	- 7.6 / - 3.7	0	5	-10.66	- 3.6 / - 1.8	0	5	- 6.16	- 3.1 / - 1.3	0	5	- 7.82
- .3 / .4	5	0	2.92	- 3.2 / - 2.3	1	4	- 1.48	- 2.8 / - 1.5	0	5	- 2.69	- 1.6 / - .7	0	5	- 3.61	- 1.2 / - .8	1	4	- 6.40
.5 / .8	5	0	12.45	- 2.2 / - 1.6	2	3	2.27	- 1.2 / - .9	2	3	- .04	- .5 / - .4	2	3	- .04	- .7 / - .5	3	2	1.03
.9 / 1.5	5	0	11.83	- 1.6 / - 1.0	4	1	1.16	- .8 / - .6	1	4	.67	- .3 / .2	3	2	1.11	- .4 / .1	4	1	.54
1.6 / 1.9	4	1	9.17	- 1.0 / - .1	1	4	- 1.39	- .4 / - .1	4	1	.60	.2 / .6	5	0	3.64	.1 / .6	5	0	6.13
2.0 / 2.6	5	0	19.98	.5 / 1.3	5	0	5.91	.2 / .8	5	0	5.13	.6 / .9	5	0	8.52	.7 / 1.0	5	0	8.76
2.6 / 3.2	5	0	23.16	1.6 / 2.0	5	0	12.54	.8 / 1.7	5	0	8.74	1.3 / 1.6	5	0	11.75	1.1 / 2.0	5	0	11.02
3.3 / 4.4	5	0	27.12	2.1 / 3.4	5	0	14.85	2.0 / 2.5	5	0	8.32	1.6 / 2.1	5	0	9.68	2.5 / 3.3	5	0	13.76
4.9 / 9.2	5	0	41.50	4.5 / 9.2	5	0	24.24	3.4 / 7.4	5	0	21.60	2.3 / 4.8	5	0	23.50	3.5 / 5.9	5	0	29.52

Figure 11.   The Effect of Variation in Net Earnings in Per Cent of Total Sales
on the Average Rate of Gain on Net Worth for the Period 1931-1935.

other income being an appreciable source of income to co-operative elevator associations. In every interval, as the margin of earning on sales increased, the rate of gain on net worth increased. A majority of the elevators operating on a successful basis have ratios within the ranges between .1 and 5.0. From .1 to 2.0 appears to be an acceptable range, with 2.1 to 7.0 as the desirable. A margin above 7.0 may often be desirable but is not included in the desirable range since extremely high income more often is due to increasing inventory value on unprotected grain which is not recommended as a practice for cooperative elevators.

Gross Earnings on Total Sales

The gross earnings divided by the total sales gives the margin on sales or the gross margin. The gross margin is the per cent of margin on the sales before the operating expenses have been deducted.

The ability of an organization to meet operating expenses and show a desirable margin of earnings above expenses, as discussed in the preceding comparison, depends on the gross margin charged on the total of all sales. By subtracting from the per cent of gross margin in sales the per cent of net earning in sales, the per cent operating

expenses are of total sales is found. The ratio of operating expense to total sales is an important measurer of efficiency since it shows the cost involved in handling a dollar of sales.

In Table 17 it may be observed that some of the deciles in which a higher gross margin occurs have less earnings than the smaller ratios. This is a result of a higher per cent of operating expense.

In Figure 12 a margin of less than 4 per cent is indicative of a high per cent of the elevators showing a loss. With a margin from 4.1 to 6.0 per cent, nearly half of the cases show a loss and an average rate of gain of only 1.97 per cent. Any margin above 6.0 per cent should be acceptable. However, in considering the gain on net worth and the number of elevators actually maintaining those margins, probably a margin of 6.0 to 14 per cent can well be given as a desirable range.

There were only four of 250 cases where a margin of above 16 per cent was taken. While extremely large margins may be desirable, as far as income is concerned, it is believed that maximum service can be rendered by margins not in excess of those included in the desirable range. For the ratios in the desirable range, where the probability of loss was below 30 per cent in all intervals, there was

Table 17. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Gross Earnings on Total Sales.

	1931				1932				1933				1934				1935			
	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
	1.2				1.4				- 8.6				1.7				-12.3			
	3.6	2	3	- 1.20	4.3	1	4	-14.45	3.3	1	4	-38.37	3.1	2	3	.24	1.7	2	3	- 6.14
	4.7				4.5				3.8				3.1				2.6			
	5.2	4	1	11.92	6.2	2	3	- 1.52	5.4	1	4	- .74	3.5	3	2	3.16	3.8	2	3	4.20
	5.2				6.5				5.5				3.6				3.8			
	5.6	2	3	- .18	6.9	2	3	2.26	5.7	3	2	2.71	4.0	2	3	- 6.48	4.1	3	2	6.29
	5.7				6.9				5.9				4.0				4.2			
	6.6	4	1	10.16	8.0	4	1	9.26	7.1	1	4	- 1.93	4.5	3	2	2.49	4.8	1	4	- 4.67
	6.7				8.5				7.3				4.6				4.8			
	7.2	5	0	13.95	9.1	2	3	2.33	9.0	5	0	6.14	5.1	2	3	.23	5.2	3	2	2.30
	7.2				9.2				9.1				5.1				5.3			
	8.0	4	1	14.17	9.7	4	1	5.60	9.4	2	3	- .21	5.7	5	0	5.33	7.2	5	0	13.06
	8.1				9.8				9.9				6.2				7.6			
	8.5	5	0	21.90	10.1	2	3	.89	10.4	2	3	1.22	6.5	2	3	3.30	8.2	4	1	.67
	8.5				10.7				10.7				6.5				8.2			
	9.5	5	0	21.20	11.2	3	2	4.98	11.3	3	2	5.03	7.5	2	3	13.42	9.0	4	1	23.71
	9.5				12.0				11.4				7.5				9.2			
	12.0	5	0	25.57	13.3	4	1	10.87	12.1	5	0	13.39	9.6	5	0	7.85	10.8	4	1	3.47
	12.7				13.6				12.4				9.8				10.9			
	15.0	4	1	18.86	19.0	5	0	14.12	20.6	4	1	7.36	15.8	4	1	5.65	16.5	5	0	7.19

Per Cent Showing Loss

Rate of Gain

32		80
28		70
24		60
20		50
16		40
12		30
8		20
4		10
0		0
-4		

-79.25

Undesirable

Desirable

(Range of Ratios)

Acceptable

0 or Less	.1 to 2.0	2.1 to 4.0	4.1 to 6.0	6.1 to 8.0	8.1 to 10.0	10.1 to 12.0	12.1 to 14.0	14.1 to 16.0	16.1 to 18.0	18.1 to 20.0	20.1 to 22.0

(Number of records falling within each range)

2	11	32	53	49	49	29	14	7	2	1	1
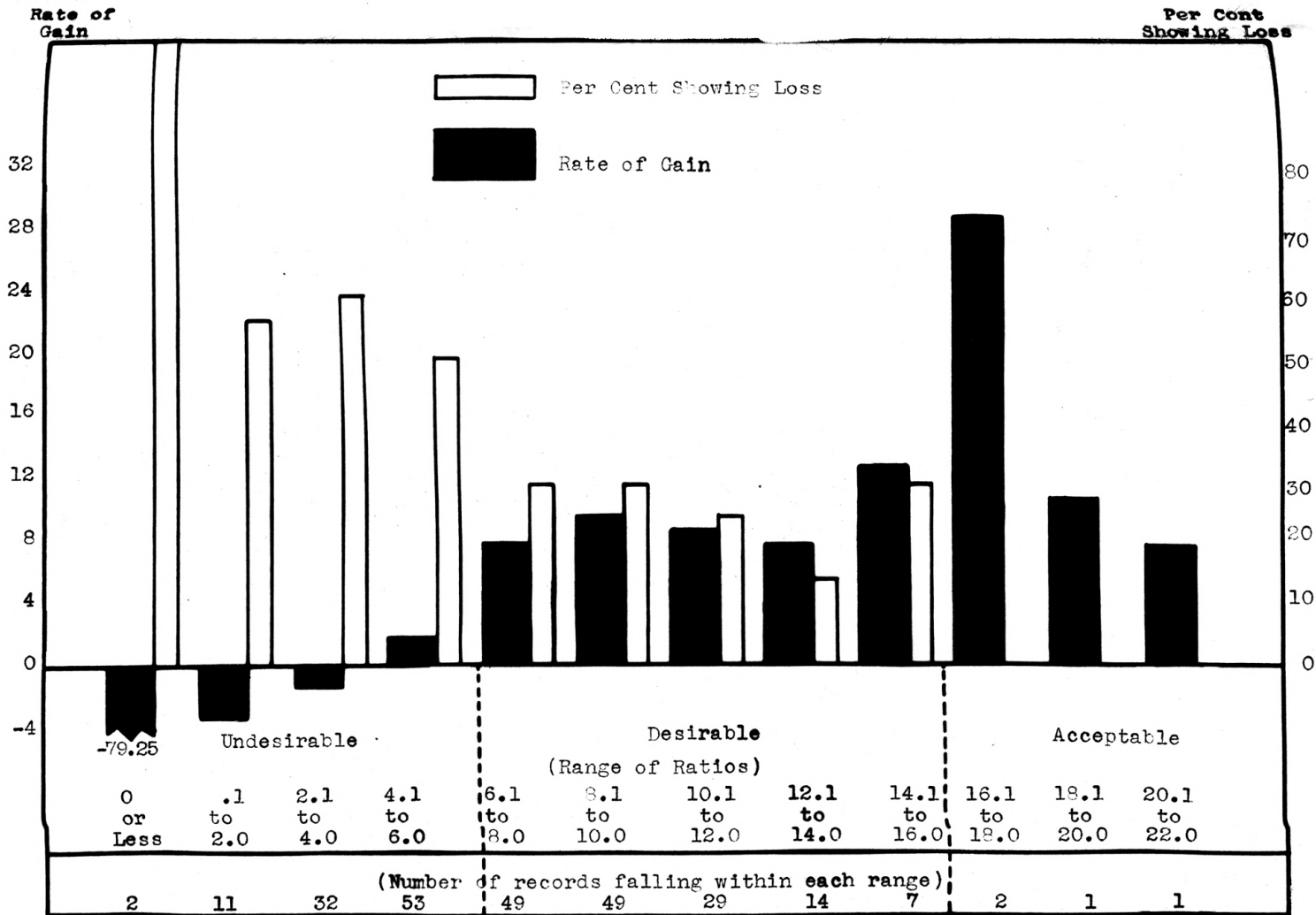
Figure 12.   The Effect of Variation in the Ratio of Gross Earnings to Total Sales on the
Average Rate of Gain on Net Worth for the Period 1931-1935.

a representative number of cases, and the rates of gain were satisfactory.

Gross Earnings on Wheat Sales

The gross earning on wheat sales divided by the wheat sales gives the margin on wheat sales or gross margin on wheat sales.

Since the southwestern Kansas elevators are organized principally for the marketing of grain, which is primarily wheat, it becomes important to know how the changing margins on wheat affect the total income on sales. As discussed in the review of literature, Green and Rucker found a margin of 4 per cent to be more closely associated with high income elevators than with the low income elevators. However, more recently the Extension Service has used 5 per cent as a desirable standard.

Cooperative elevator managers consider a number of factors in setting their margins. Local competition, freight or shipping cost, and local handling cost are the most important factors considered in adjusting margins. In meeting or bettering competition, some associations are actually handling wheat on no margin at all. In these cases they depend on larger prorates from their cooperative regional through increased volume as their source of rev-

enue. Where such a practice is in force the service of the local association can not be measured in terms of income. Practically speaking, they are paying their prorates to the farmer at the time of purchase in terms of a higher market price.

Figure 13 is a summary of 242 cases. There were eight records during the years 1931 to 1932 in which wheat sales were not kept separately and must necessarily be omitted from this comparison. The greatest probability of loss occurred when less than 3 per cent margin was taken. For the elevator records falling within ranges of 1.0 to 3.0, the probability of loss varied from 52 to 59 per cent and in each of these ranges an average rate of loss occurred. A range with ratios of 3.1 to 4.0 might be called acceptable and the desirable from 4.1 to 6.0 per cent. In the range 4.1 to 5.0 there were 26 elevators with only 12 per cent showing a loss and the average rate of gain was two dollars. In the range of 5.1 to 6.0, 28 elevator records showed a higher average rate of gain or 2.51 per cent, but a larger per cent was in the loss group. Any margin above 6 per cent might be considered acceptable or even desirable for elevator associations, depending on local conditions.
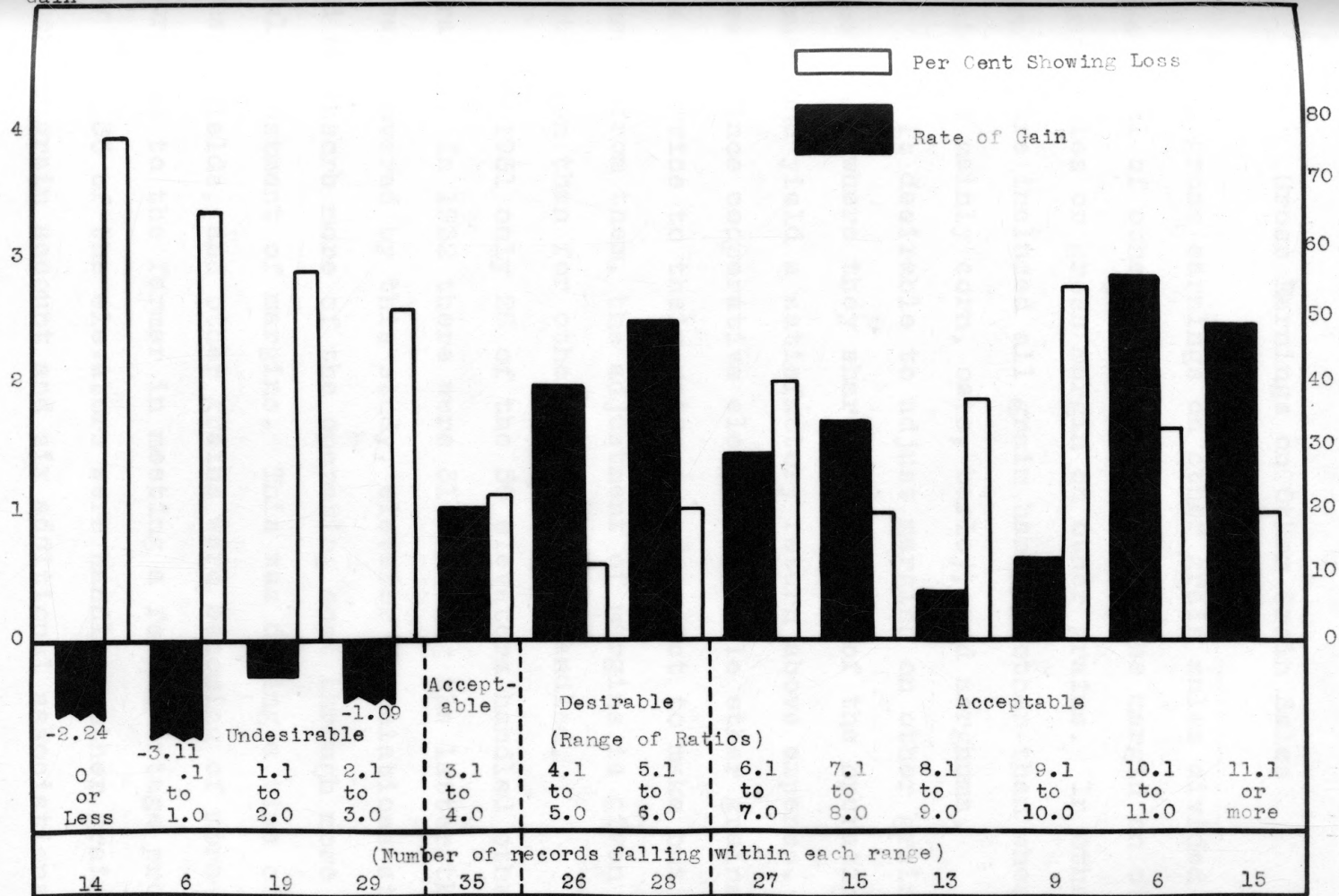
Figure 13. The Effect of Variation in the Gross Earnings from Wheat Sales on the Average Rate of Gain on Dollar Sales for the Period 1931-1935.

Gross Earnings on Other Grain Sales

The gross earnings on other grain sales divided by
the total of other grain sales gives the margin on other
grain sales or gross margin on other grains. In other
grains are included all grain handled other than wheat,
which is mainly corn, oats, barley, and sorghums.

It is desirable to adjust margins on other grains to
the point where they share their load of the operating ex-
pense and yield a satisfactory return above expense. How-
ever, since cooperative elevators handle other grains more
as a service to their patrons and expect to make but little
income from them, the adjustment of margins is given less
attention than for other commodities handled.

In 1931 only 28 of the 50 elevators handled other
grains. In 1932 there were 31. During the latter three
years covered by this study, elevator associations attempt-
ed to absorb more of the operating cost through more care-
ful adjustment of margins. This was during a time of low
wheat yields, and other grains were becoming of more im-
portance to the farmer in meeting a feed shortage problem.
By 1935, 36 of the elevators were handling other grains as
another grain account and six additional associations were
handling other grains under their wheat or merchandise ac-

count. Other grains did not make up enough of the total
volume of business to show any correlation to earnings for
the entire business.

Table 18 shows the number of associations handling
other grains for each of the years and the amount of gross
margin charged. Only a few of the cases occur in the in-
tervals where more than 15 per cent margin was taken.
Twenty-two records show no margin at all and 21 of these
22 handled other grains at a loss even before the operating
expense was deducted. The Extension Service of Kansas
State College has used 7 cents per dollar as a standard
margin on other grains. Twenty-three of 169 cases did
charge a margin of 6.1 to 8 cents.

For other grains to maintain their share of the oper-
ating cost, no less than 7 per cent margin should be taken
and it is doubtful that a majority of the associations can
go much beyond that due to local competition.

Gross Earnings on Sideline Sales

The margin on sideline sales is calculated in the
same way as the gross margin on wheat sales. Divide the
gross earnings from sidelines by the total of sideline
sales.

Table 18. Gross Earnings on Other Grain Sales.

Range	1931 Number of Elevators	1932 Number of Elevators	1933 Number of Elevators	1934 Number of Elevators	1935 Number of Elevators	5 Yr. Summary Number of Elevators
.680 .699		1	1		1	3
.700 .719		1				1
.720 .739		1				1
.740 .759	1	2				3
.760 .779		1				1
.780 .799				1		1
.800 .819	2		2	1		5
.820 .839	1	1		1		3
.840 .859		3	1	3	1	8
.860 .879	4	3	2	1	1	11
.880 .899	2	2	6	1	1	12

Table 18 Con't.

.900 .919	1	4	3	2	2	12
.920 .939		3	7	4	9	23
.940 .959	3	3	14	11	5	36
.960 .979	3		1	4	11	19
.980 .999	3		1	3	1	8
1.0 or more	8	6	1	3	4	22
Total	28	31	39	35	36	169

The problem of determining desirable margins on sideline sales is different from that on wheat sales. In wheat sales there is only one commodity. However, in the case of sidelines, many different commodities are handled. When all of the sidelines are grouped together and equal as much as 20 per cent of the total business, there is a greater chance for the elevator association to show a profit. This was pointed out by Mather. Hence, the gross margin on sideline sales is determined by varying margins on a number of different commodities. Practically all the associations are now organizing their sidelines as a permanent part of the business. This part of the business offers a chance for savings and a way to absorb operating expenses at a time of the year when the grain business is virtually inactive from the local elevator standpoint. As the sideline sales become a more important part, the management becomes interested in determining the margins or savings the sidelines must yield in earning the desired savings and absorbing operating expense. In knowing what constitutes a desirable range of margins on sidelines, elevator associations are better able to select those sideline commodities that will justify their handling.

Some of the commodities handled as sidelines by southwestern Kansas cooperative elevators during the crop season

1935, their per cent of total sales and margins, are listed as follows:

Commodity	Per Cent of Total Sales	Gross Margin
Sorghum	1.08	12.90
Feed	.92	11.17
Coal	4.24	12.96
Merchandise	10.12	8.60
Twine	.03	8.57
Gasoline	8.74	18.72
Kerosene	.44	25.38
Distillate	.14	31.24
Oil & Grease	.66	24.39
Accessories	.01	11.63
Implements	.76	11.01
Lumber	.05	16.50

In Figure 14 the smaller income elevators seem to be correlated more closely with sideline margins of less than 12.0 per cent. The ranges from 12.1 to 20 appear to be acceptable margins with a large number of cases falling within those ranges. The desirable range, or the sideline margins which are more closely associated with the larger income elevators, are 20 per cent or more. In other words,

Rate of
Gain

Per Cent
Showing Loss

☐ Per Cent Showing Loss

■ Rate of Gain

Undesirable

Acceptable
(Range of Ratios)

Desirable

0 or Less	.1 to 2.0	2.1 to 4.0	4.1 to 6.0	6.1 to 8.0	8.1 to 10.0	10.1 to 12.0	12.1 to 14.0	14.1 to 16.0	16.1 to 18.0	18.1 to 20.0	20.1 to 22.0	22.1 to 24.0	24.1 to 26.0	26.1 to 28.0	28.1 to 30.0	30.1 or more

(Number of records falling within each range)

7	2	3	10	15	25	32	27	25	35	11	13	11	5	5	6	6
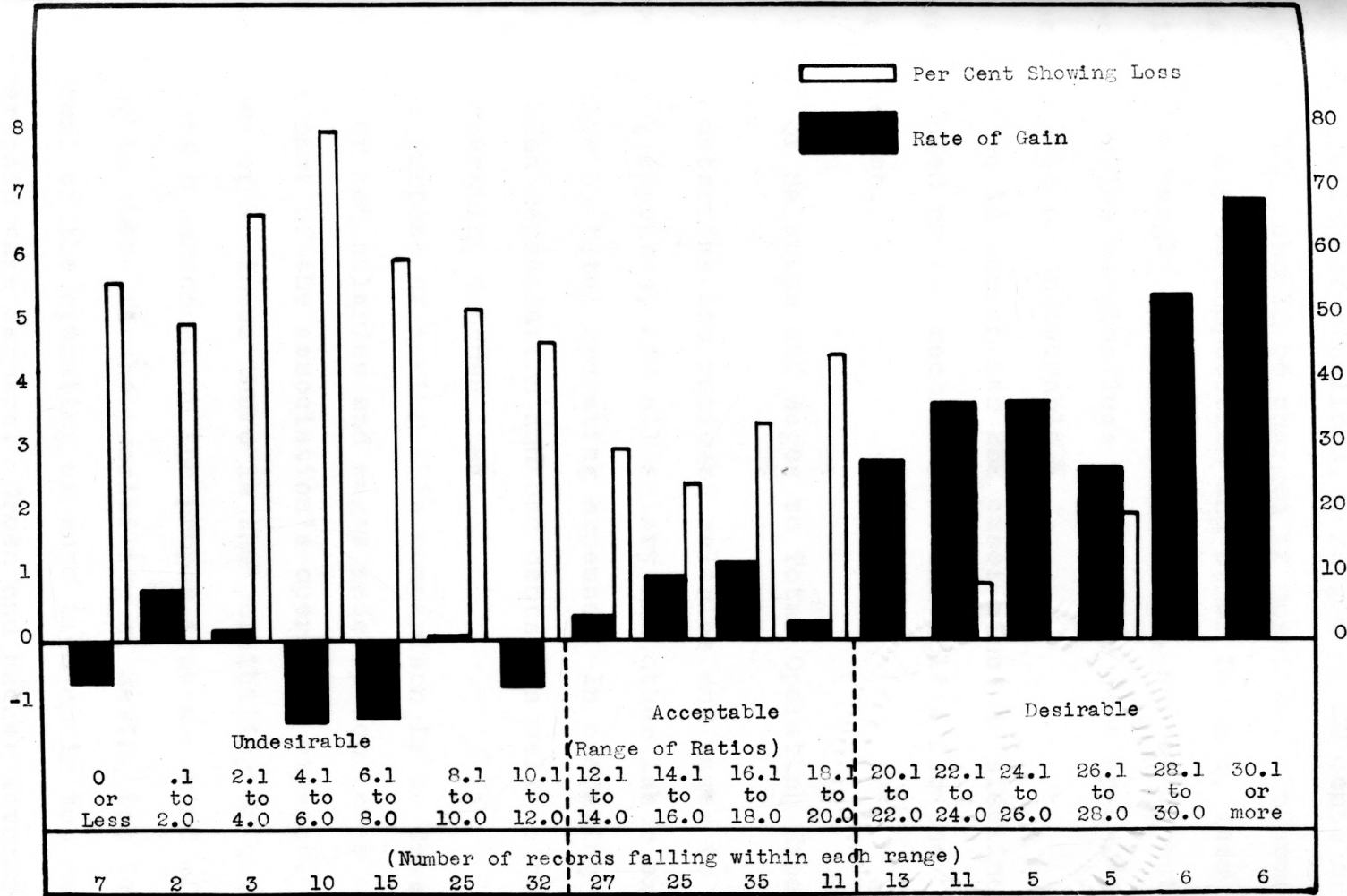
Figure 14.   The Effect of Variation in the Gross Earnings from Sideline Sales on the Average
Rate of Gain on Dollar Sales for the Period 1931-1935.

in the handling of sidelines, a margin of 20 cents or more on the dollar should be charged if possible. In some associations, due to competition and other factors, less than this, or a margin of 12 to 20 per cent, may be acceptable. Gross sideline margins less than 12 per cent appear to be questionable or undesirable.

Figure 14 summarizes 238 cases since no sidelines were handled or the records were incomplete for the remaining 12 cases.

Ratio of Salaries and Wages to Total Operating Expense

To determine the ratio of salaries and wages to total operating expenses, add all salary and other labor expense and divide by total operating expense. In operating expense is included depreciation and bad debts, as well as the more common operating expense items.

The purpose of making this comparison is to determine whether or not salaries and wages made up too large or too small a part of the association's operating expense. In all types of business there is the possibility of having insufficient personnel or the proper type and kind of managers just as there is the possibility of having too large a per cent of the operating expense tied up in too many and over-paid wage earners. Green and Rucker advocated a

desirable standard of .6 or 60 per cent of operating expense represented by salaries and wages.

In 1931, from Table 19, there appears to be little variation in the rate of gain where the range of the ratios is from 27.2 per cent to 55.5 per cent. However, in 1932, a year of lower volume, those deciles having the larger rates of gain were in the upper deciles. The same tendency is true for the following years.

From a summary of the five years as shown by Figure 15, those cases falling within the range where ratios are below 40 per cent show an average rate of loss in every interval. The cases showing the largest average rate of gain and showing the smallest per cent of loss fell in the ranges where the ratios were between 40 and 70 per cent. The two records having a ratio of more than 70 per cent both showed a loss. The nine elevators averaging the largest rate of gain showed 60 to 65 per cent of their operating expense to be salaries and wages. Only 22 per cent of this group showed a loss. A majority of the elevators seem to be operating in the ranges between 35 and 60 per cent. In general, it can be stated that salaries and wages should represent not less than 40 per cent and not more than 65 per cent of operating expense.

Table 19. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Ratio of Salaries and Wages to Total Operating Expense.

1931 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1932 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1933 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1934 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	1935 Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
*				*				19.0–29.2	2	3	-29.27	25.1–30.7	3	2	.44	25.5–32.3	1	4	- .15
27.2–39.7	5	0	17.35	26.6–30.5	2	3	- 1.60	30.9–36.3	3	2	- .05	35.0–38.0	1	4	- 1.86	34.4–37.0	2	3	.04
43.0–45.5	5	0	18.02	30.9–39.2	2	3	4.83	37.1–40.0	2	3	-16.91	39.6–41.7	1	4	- .01	37.1–42.9	3	2	- .18
45.6–47.7	4	1	15.65	39.4–40.0	2	3	-20.54	40.7–42.6	3	2	- 3.86	43.0–45.8	2	3	- .78	44.3–48.0	3	2	.04
47.8–50.0	5	0	19.94	41.0–48.6	4	1	15.85	44.0–45.1	2	3	- 3.35	46.2–49.0	5	0	1.76	48.0–49.6	5	0	3.30
50.7–52.1	4	1	10.55	48.7–49.2	3	2	- 8.11	45.3–47.3	3	2	4.80	49.0–50.0	3	2	.41	50.8–51.0	4	1	1.01
53.0–55.5	5	0	11.10	49.5–52.9	4	1	8.46	48.1–50.2	4	1	16.29	50.0–51.0	4	1	.85	52.0–53.0	4	1	.39
56.2–59.2	3	2	5.72	53.1–56.0	2	3	6.28	50.6–53.6	5	0	20.03	51.5–53.4	4	1	- .25	53.0–53.9	5	0	2.06
59.4–64.7	3	2	7.45	56.6–59.7	2	3	5.02	54.0–58.8	2	3	1.58	53.6–56.8	3	2	.69	54.0–56.8	2	3	.65
66.3–76.0	4	1	2.78	59.8–68.0	4	1	7.56	59.0–70.8	2	3	- .50	57.0–62.7	4	1	2.17	58.6–65.1	4	1	1.34

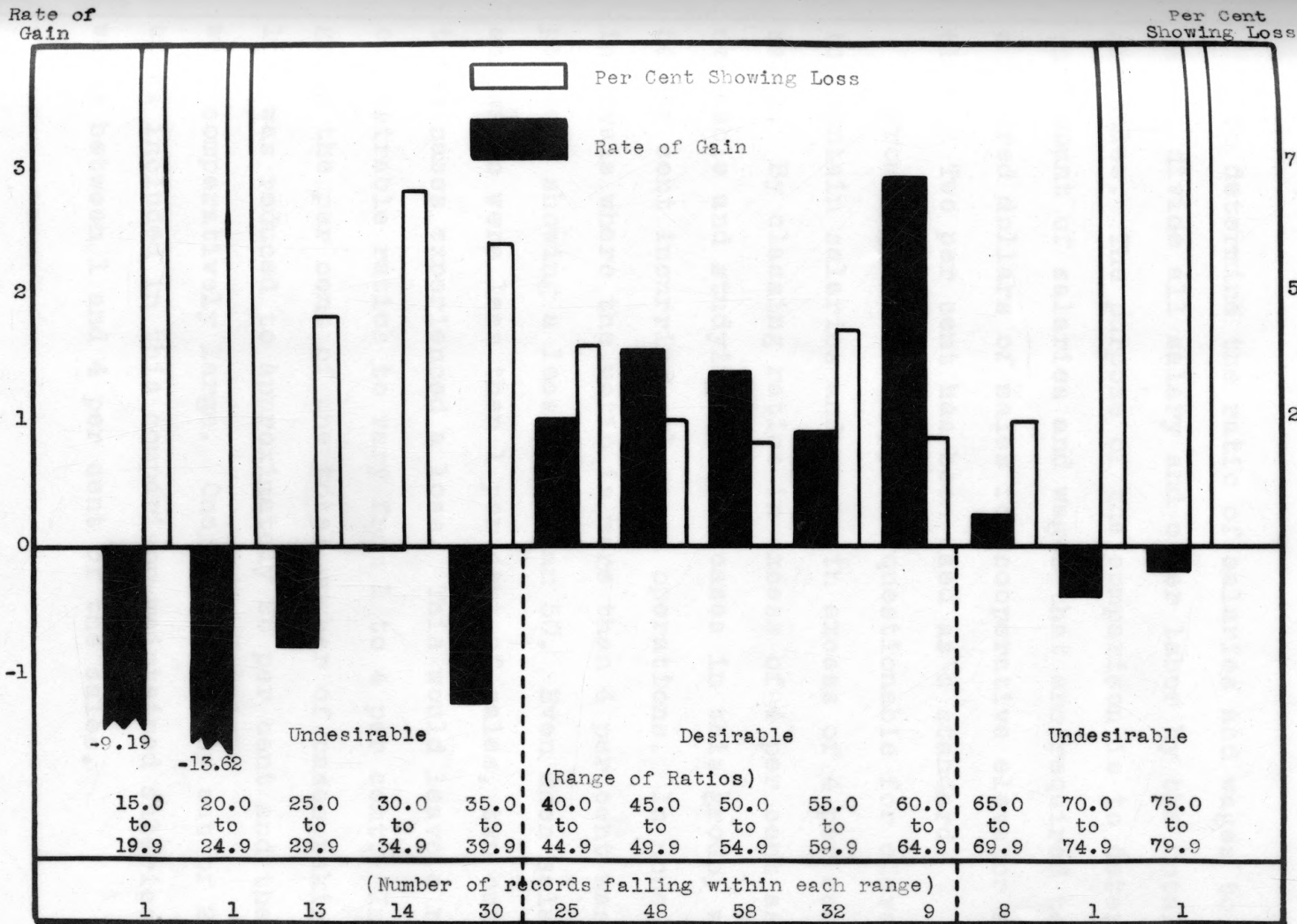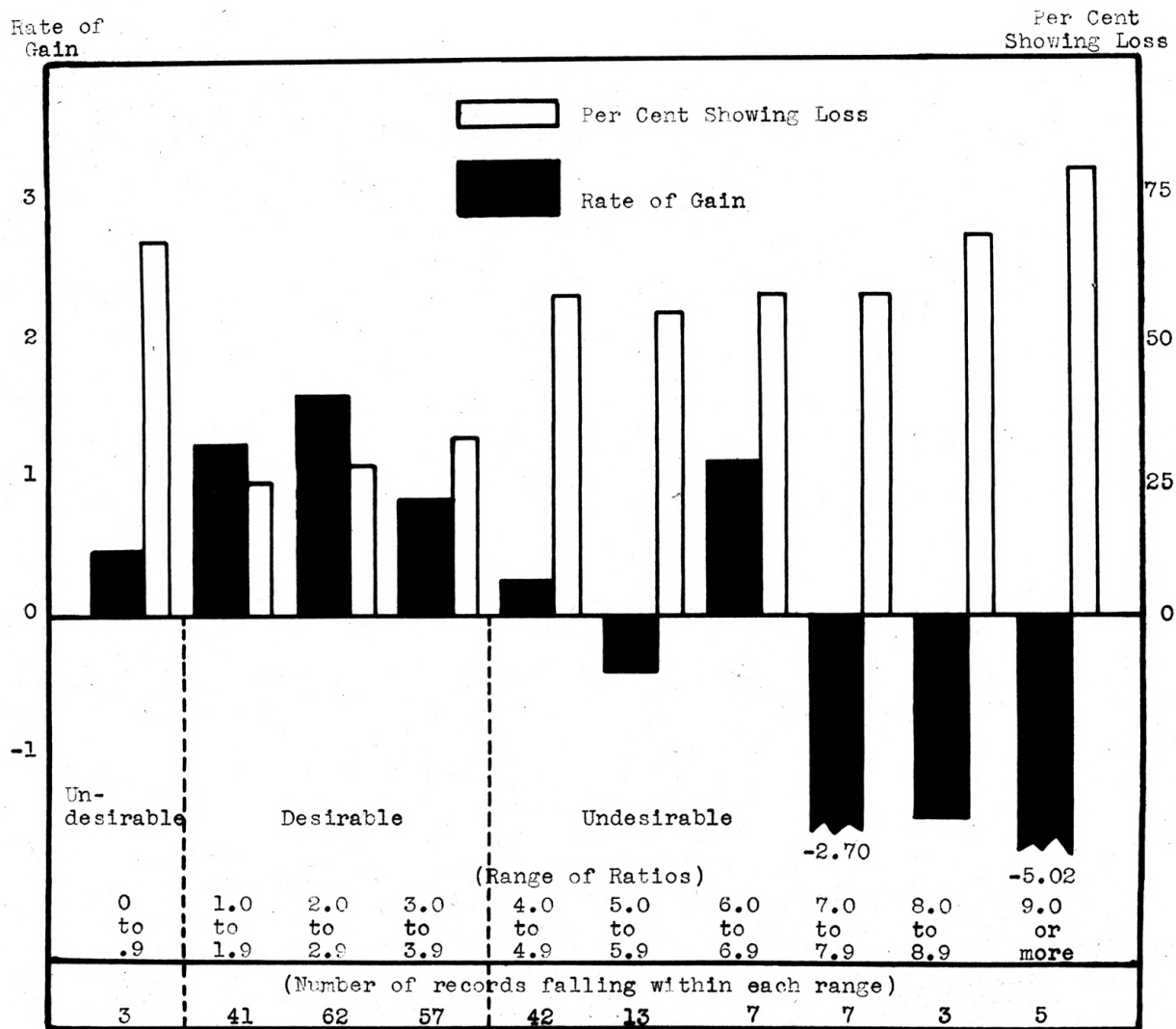* Records for these deciles unavailable.

Figure 15. The Effect of Variation in the Ratio of Salaries and Wages to Total Operating
Expense on the Average Rate of Gain on Sales for the Period 1931-1935.

Ratio of Salaries and Wages to Total Sales

To determine the ratio of salaries and wages to total
sales, divide all salary and other labor by the total of
all sales. The purpose of the comparison is to determine
the amount of salaries and wages that are required to handle
a hundred dollars of sales for cooperative elevator associa-
tions. Two per cent has been used as a standard.

From Figure 16 it appears questionable for elevators
to maintain salaries and wages in excess of 4 per cent of
sales. By classing ratios in excess of 4 per cent as un-
desirable and studying all the cases in this group, we find
54 per cent incurring a loss on operations. In none of the
intervals where the ratio is more than 4 per cent was the
per cent showing a loss less than 50. Even when salaries
and wages were less than 1 per cent of sales, two out of
three cases experienced a loss. This would leave a range
of desirable ratios to vary from 1 to 4 per cent. In this
group the per cent of the total number of cases taking a
loss was reduced to approximately 25 per cent and the gains
were comparatively large. One hundred sixty out of 240
cases included in this comparison maintained salaries and
wages between 1 and 4 per cent of the sales.

Rate of
Gain

Per Cent
Showing Loss

Per Cent Showing Loss

Rate of Gain

3

2

1

0

-1

75

50

25

0

Un-
desirable

Desirable

Undesirable

-2.70

-5.02

(Range of Ratios)

0 to .9	1.0 to 1.9	2.0 to 2.9	3.0 to 3.9	4.0 to 4.9	5.0 to 5.9	6.0 to 6.9	7.0 to 7.9	8.0 to 8.9	9.0 or more

(Number of records falling within each range)

3	41	62	57	42	13	7	7	3	5

Figure 16. The Effect of Variation in the Ratio of Salaries and Wages to Total
Sales on the Average Rate of Gain on Sales for the Period 1931-1935.

VOLUME OF BUSINESS ANALYSIS

Membership Patronage

Membership patronage is calculated by dividing the number of active members by the number of stockholder members. By active member is meant a member giving most or all of his business to the association.

The percentage of members patronizing the association is important from the standpoint of increasing volume through greater patronage and is also important from a legal standpoint since the Capper Volstead Act requires that not less than 50 per cent of the business shall be done with members. Membership patronage may be an indication of how the members react to the service of their cooperative organization. This comparison should be a better index of the membership reaction to the cooperatives service than of the cooperatives service to the entire community since the association may be forcing competing firms to give greater service to the entire community.

In attempting to correlate the per cent of members patronizing the association with that of total net income per active member, the purpose was twofold. The first was to determine what per cent of patronage is necessary to reduce the probability of loss, and the second was to deter-

mine whether or not the earnings or prorates per active member could be expected to increase when a larger number were patronizing the association.

Figure 17 summarizes 250 records. Of those elevator associations having a patronage of less than 50 per cent, six of ten, or 60 per cent, showed a loss even though there was a slight average rate of gain for the group. When the patronage increased to between 50.0 to 59.9 per cent, the number of those showing a loss was reduced to 43 per cent.

In the 50.0 to 59.9 per cent range, an average rate of loss of .49 per cent was sustained. It is probable that the loss of .49 per cent is more representative of less than 60 per cent patronage where 21 cases occur, than an average gain of $3.11 is for the range where less than 50 per cent are patrons in which only 10 cases occur.

The probability of loss was reduced to 30 per cent when the patronage was increased from 60 to 70 per cent. In this same range the profit per member patron increased from a loss to $22.99. In the next higher range of ratios, 50 per cent lost money and the gain per member patron was $4.95. Even better results were obtained from the records where there was better than 80 per cent patronage. Particular attention should be called to the fact that with more than 90 per cent patronage only 17 per cent of 41 ele-
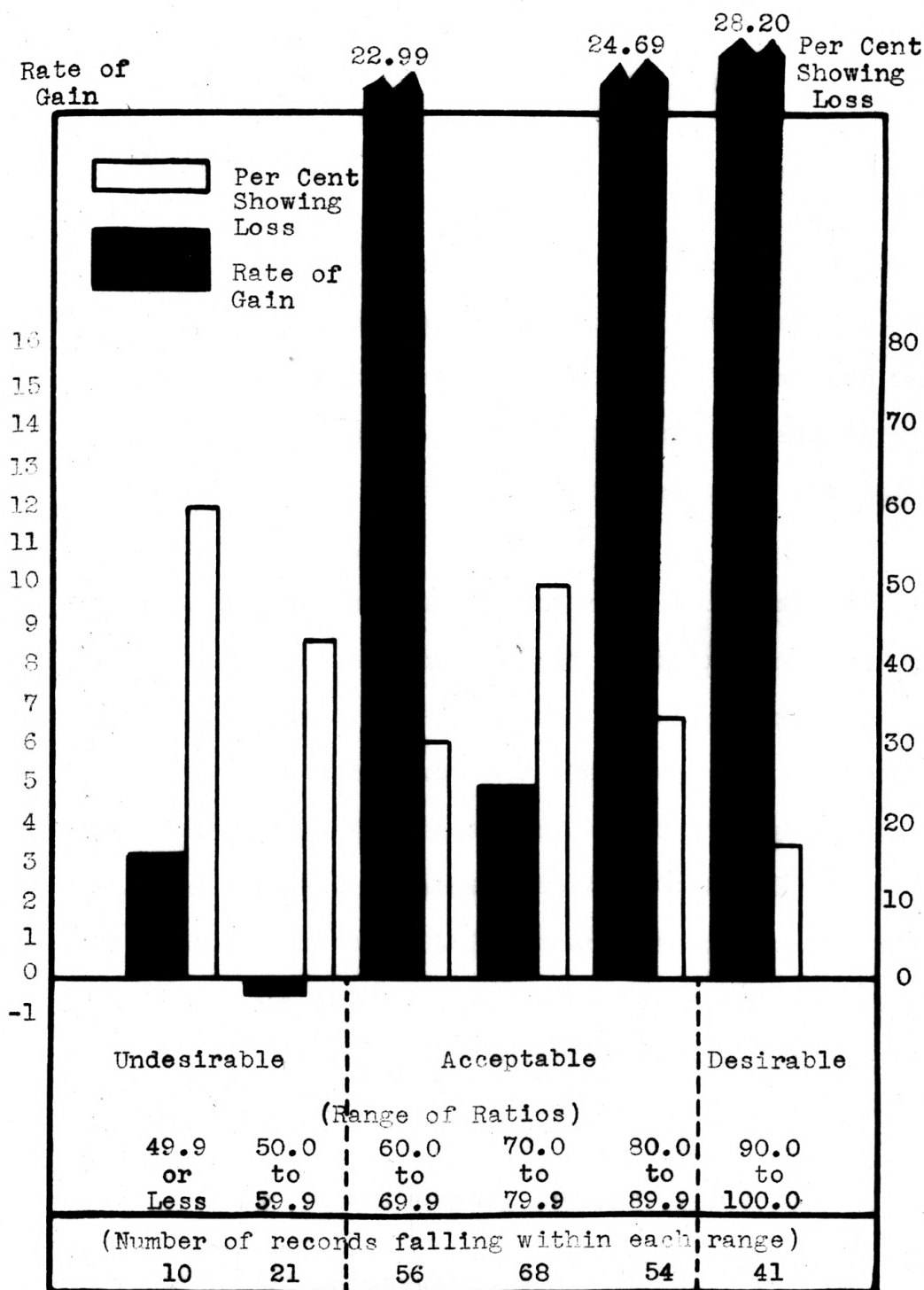
Figure 17. The Effect of Variation in the Per Cent of
Members Patronizing the Association on the
Average Rate of Gain per Member Patron for
the Period 1931-1935.

vator records showed a loss and the amount of earning per member patron was $28.20.

Three important observations may be made from this study: (1) those elevators with less than 60 per cent patronage are in greatest danger of showing a loss, (2) the chances for showing a loss were not greatly reduced until the patronage was above 90 per cent, and (3) the earning per member patron is considerably larger when the patronage is above 80 per cent.

The latter of the above mentioned observations shows that a farmer could expect his patronage savings to be greater when a larger per cent of his neighbors are patronizing the association than when they are not. In other words, a farmer delivering all of his business to the association could expect a larger prorate when all of his neighbors were doing the same thing than when a smaller number were patrons. It should then be to his interest not only to deliver his own business to his organization but to encourage the same of his neighbors.

Membership Needed

The study of membership needed is not made on the basis of any ratio comparison except to observe the effect in variation of total membership on the rate of gain or loss on

dollar sales. By total membership is meant the total number of stockholder members.

Table 20 averages the rate of gain or loss per decile of all 50 elevators for the five year period on an annual basis. Table 21, as well, covers the same scope.

In none of the lower five decile groups (lower decile groups from an array basis) is the average gain above 1.76 per cent except for one decile in 1931 which averaged 3.78 per cent. Thirteen out of 25 of these lower decile groups showed a loss and in no case is the actual range above 121 members. Of the upper 25 deciles, where the membership ranged from 121 to 355, 12 show an average gain above 1.76 and only six show a loss. The largest rates of gain are found in the decile groups with an actual membership above 193.

Table 21 groups the entire 250 elevator records into 10 class intervals. Each of the upper three intervals, where the membership ranges above 200, has a higher average rate of gain than any of the lower seven intervals. Forty-six of the elevator records showed a total membership above 200. The greatest probability of loss occurred among the elevators with a membership below 80 where 59 per cent, or 19 of 32 cases, showed a loss. With associations having a membership of 100 to 200 the chances for loss varied from

Table 20. Annual Rate of Gain or Loss of Associations Arrayed on the Basis of Total Membership.

	1931				1932				1933				1934				1935			
	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss	Actual Range	No. Showing Gain	No. Showing Loss	Average Rate of Gain or Loss
	40–66	3	2	1.29	40–70	3	2	.35	40–70	2	3	– .52	40–62	2	3	– .92	45–62	2	3	– .37
	72–88	4	1	3.78	72–94	3	2	1.61	72–96	1	4	.14	70–87	3	2	1.51	72–90	3	2	.82
	94–97	5	0	1.50	95–98	2	3	– .80	97–101	2	3	-4.91	96–98	3	2	.27	95–98	4	1	1.54
	98–109	3	2	– .48	98–111	2	3	-1.97	102–112	1	4	-3.03	102–112	1	4	-1.27	98–109	3	2	1.03
	111–121	4	1	1.76	112–119	2	3	– .53	113–121	2	3	-2.33	112–121	3	2	-1.78	109–121	3	2	– .47
	122–134	4	1	.16	121–134	3	2	-2.74	122–136	4	1	1.22	127–140	3	2	.82	131–143	4	1	.79
	136–165	5	0	2.66	135–165	2	3	– .49	140–170	4	1	.13	143–170	3	2	– .30	145–178	2	3	-1.08
	170–188	4	1	2.31	170–188	3	2	.08	174–193	2	3	– .78	178–193	3	2	.27	181–193	2	3	– .29
	193–212	5	0	5.10	193–215	5	0	4.06	197–221	5	0	4.43	205–221	4	1	2.48	197–221	5	0	3.16
	224–355	4	1	3.66	224–355	4	1	4.06	224–355	5	0	3.41	224–348	5	0	2.34	225–348	5	0	3.32

Table 21. The Effect of Variation in Total Membership
on the Average Rate of Gain on Sales.

Range	Number of Elevators	Per Cent Showing Loss	Average Rate of Gain or Loss
79.9 or less	32	59	.001
80.0 to 99.9	47	36	.50
100.0 to 119.9	41	51	- .88
120.0 to 139.9	31	32	.01
140.0 to 159.9	15	33	- .16
160.0 to 179.9	19	47	.47
180.0 to 199.9	19	37	.34
200.0 to 219.9	18	0	4.66
220.0 to 239.9	8	13	3.75
240.0 or more	20	10	3.05

32 to 47 per cent and in no range within this group did
there occur material gains. The most successful elevators
were those with a membership of 200 to 220. In none of the
cases within this range did there occur a loss and they
showed the highest average rate of gain. There seemed to
be no especial benefit of a membership above 220.

Capacity Turnover

The capacity turnover is determined by dividing the
total bushels of grain handled by the capacity of the ele-
vator.

The name of this comparison itself implies the impor-
tance of the study. We usually think of capacity turnover
as the volume of grain business, measured in terms of the
elevators grain facilities. Since the Kansas cooperative
elevators are organized principally for marketing grain,
volume should be a close index to the amount of business
done. Previous studies in numerous cases have shown the
importance of volume in determining earnings or member
prorates. Rucker states, "With normal prices, volume is
probably the most important factor in determining the suc-
cessful operation of an organization." Green and Rucker
use 10 to 1 as desirable capacity turnover. Green shows
that for elevators handling less than 100,000 bushels a year,

only 40 to 60 per cent made any net income. Green writes
further, "Operations of local cooperative elevators in
Kansas, to be successful in the long run, must not depart
too far from the standards of experience." He then lists
volume of grain business as an important limiting factor
in operating guides.

Figure 18 includes a study of 235 records. Of these
records 90 cases had a capacity turnover of less than four
times. More than 50 per cent of the 90 operated at a loss
and the entire group had an average rate of loss. Of 72
elevator records showing a capacity turnover of four to
eight times, nearly 40 per cent showed a loss even though
the total net income per dollar sales was nearly 84 cents.
When the ratio was increased to eight to ten, the per cent
showing a loss remained about the same but the average rate
of gain almost doubled. Of 55 records having a capacity
turnover of more than 10 times, the chances for losses were
greatly lessened as only six, or a little more than 10 per
cent, showed a loss. Where the capacity turnover was more
than 14 times there seemed to be no material benefit, as far
as rate of earnings is concerned, as compared to a capacity
turnover of 10 to 14 times.

This study would indicate that if the chances for loss
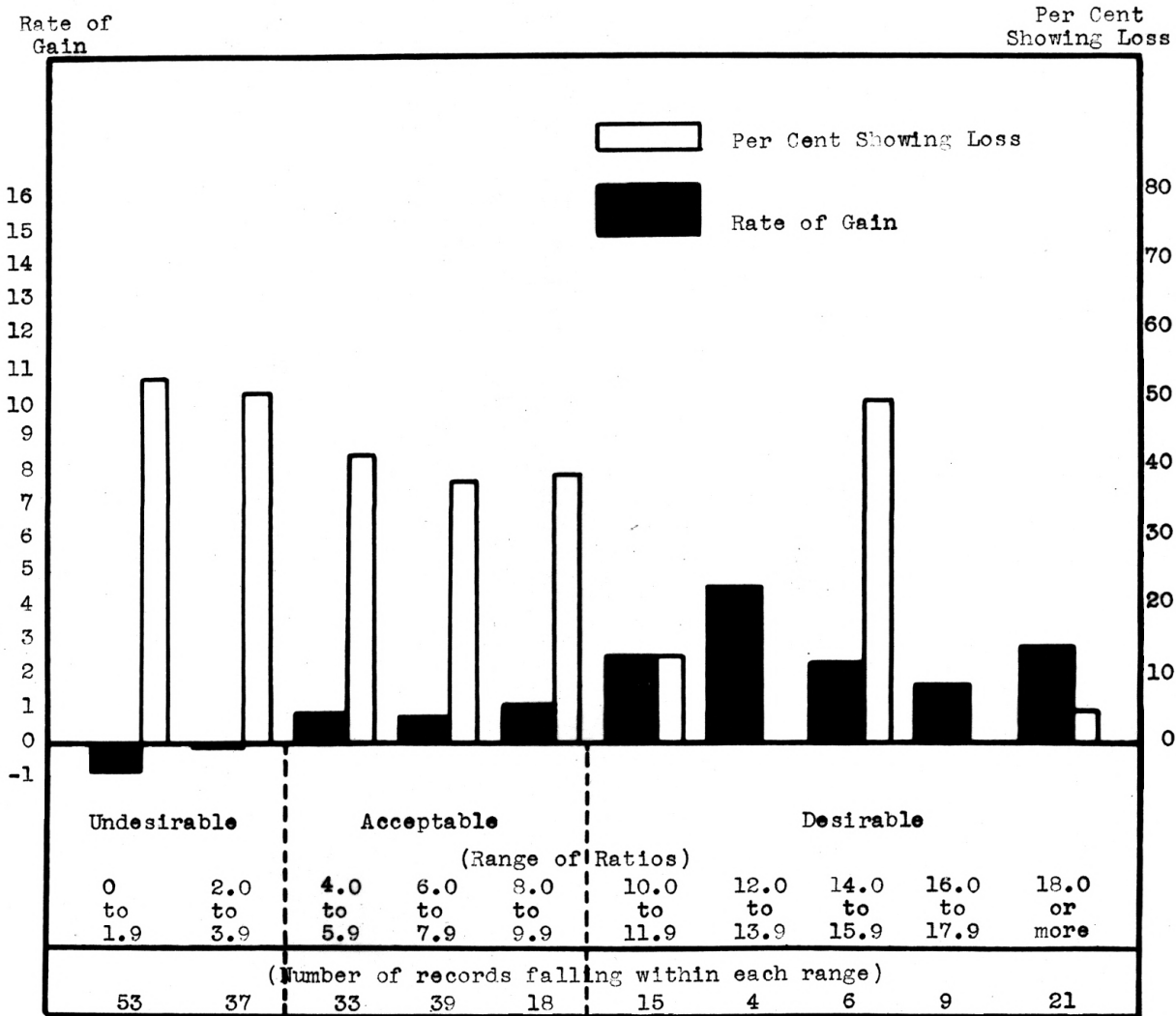are to be materially lessened and to average the highest

Figure 18. The Effect of Variation in the Capacity Turnover on the
Average Rate of Gain on Dollar Sales for the Period 1931-1935.

rate of gain, an elevator should have a volume of grain business equal to 10 times its capacity or more. An exception to this might be an elevator with large storage facilities.

SUMMARY AND CONCLUSIONS

Table 22 summarizes the undesirable, acceptable, and desirable ranges of ratios for all of the comparisons as determined by this study except those discussed beginning on pages 41, 54, and 79. The table, as well, compares these ranges with the old standard ratios as recommended by Green and Rucker from their study made in 1931.

In general it may be stated that there is considerable variation in the desirable and acceptable ratios for the comparisons included in this study. However, there is a close correlation between certain ratio ranges and successful or unsuccessful operations.

Conclusions for each of the comparisons or individual studies are listed according to type of analysis made.

Working Capital Analysis:

1. The more successful organizations have from $1.50 to $6.49 in current assets for each dollar of current liabilities. Elevator associations with more than $6.49 in current assets for each dollar of current liabilities show

Table 22. Financial and Operating Ratios for Cooperative Elevators in Southwestern Kansas.

	Old Standard Ratios	Undesirable Ratios	Acceptable Ratios	Desirable Ratios
I. WORKING CAPITAL ANALYSIS:				
1. Ratio of Current Assets to Current Liabilities	2.00	0 to .49	6.50 or more	1.50 to 6.49
2. Ratio of Cash and Receivables to Current Liabilities	1.00	0 to .74	.75 to 1.99 / 2.75 or more	2.00 to 2.74
3. Ratio of Cash to Current Liabilities	.20	0 to .19	.20 to .79 / 1.60 or more	.80 to 1.59
4. Ratio of Sideline Sales to Receivables	12.00	0 to 7.90	8.00 to 12.00	12.00 or more
5. Ratio of Receivables to Current Assets	40% or less	40.00 or more	0 to 39.90	0 to 39.90
II. FIXED CAPITAL ANALYSIS:				
1. Ratio of Total Sales to Net Fixed Assets	8.00	0 to 7.90	8.00 to 13.90	14.00 or more
2. Ratio of Net Worth to Net Fixed Assets	1.50	0 to 1.24	1.25 to 2.49 / 4.00 or more	2.50 or more
III. ANALYSIS OF CAPITALIZATION SITUATION:				
1. Ratio of Surplus to Outstanding Stock	1.00	0 to .39	.40 to 1.99	2.00 or more
2. Ratio of Net Worth to Total Liabilities	1.50	0 to .99	1.00 to 3.49 / 6.50 to 9.99	2.50 or more
IV. ANALYSIS OF FINANCIAL RESULTS OF OPERATION:				
1. Net Earning in Per Cent of Sales	2.5%	0 or less	.1 to 2.0 / 7.1 to 10.0	2.1 to 7.0
2. Gross Earnings on Total Sales	7.0%	0 to 6.0	16.1 to 22.0	6.1 to 16.0
3. Gross Earnings on Wheat Sales	5.0%	0 to 3.0	3.1 to 4.0 / 6.1 or more	4.1 to 6.0
4. Gross Earnings on Sideline Sales	15.0%	0 to 12.0	12.1 to 20.0	20.1 or more
5. Ratio of Salaries and Wages to Total Operating Expense	60% or less	15.0 to 39.9 / 65.0 or more	-- / --	40.0 to 64.9
6. Ratio of Salaries and Wages to Total Sales	2.5%	0 to .9 / 4.0 or more	--	1.0 to 3.9
V. VOLUME OF BUSINESS ANALYSIS:				
1. Membership Patronage	90.0%	49.9 to 59.9	60.0 to 89.9	90.0 to 100.0
2. Membership Needed	100	80 or less	80 to 199	200 to 220
3. Capacity Turnover	10	0 to 3.9	4.0 to 9.9	10.0 or more

acceptable results, whereas undesirable results are obtained when the ratio of current assets to current liabilities is below $1.50.

2. Seventy-five cents or more of cash and receivables for each dollar of current liabilities is required for successful operation. The most successful organizations have from $2 to $2.75 in cash for each dollar of current liabilities. Associations with 75 cents or more of cash and receivables for each dollar of current liabilities, in general, show acceptable results from operations. The elevators with less than 75 cents cash and receivables for each dollar of current liability are in great danger of incurring operating losses.

3. The more successful associations have from 80 cents to $1.60 in cash for each dollar of current liabilities. Acceptable operating results may be expected even when cash is as low as 20 per cent of current liabilities.

4. Elevators with $8 or more of sales for each dollar put on the books as receivables can expect the highest rate in earnings.

5. A majority of the elevator associations have an annual turnover on sidelines from four to 12 times the sideline inventory.

6. The largest earnings from operations occur, and

the probability of loss is least when receivables are less than 40 per cent of current assets.

Fixed Capital Analysis:

1. The more successful elevator associations have $14 or more of sales for each dollar invested in net fixed assets. The least successful associations have less than $8 in sales for each dollar invested in fixed assets. Acceptable results may be expected when total sales are from eight to 14 times that of net fixed assets.

2. The more desirable situation is to have from $2.50 to $4.00 in net worth for each dollar of net fixed assets. Acceptable operating results may be expected when net worth is from 1.00 to 1.25 times that of net fixed assets. A smaller proportion of net worth to net fixed assets is usually indicative of undesirable operating results.

3. Elevators with no fixed liabilities averaged larger gains than those with fixed liabilities.

Analysis of Capitalization Situation:

1. The more successful organizations have $2 or more in surplus for each dollar of stock outstanding. Less than 40 cents in surplus for each dollar of stock greatly increases the probability of loss. Associations may be expected to show acceptable results when 40 cents to $1.99 in surplus is maintained in proportion to $1.00 of stock.

2.   The more successful associations carry $3.58 to
$6.50 in net worth for each dollar of liabilities. Accept-
able results may be expected as long as $1 or more in net
worth is maintained for each dollar of liabilities.

Analysis of Financial Results of Operation:

1.   A majority of the more successful associations
show a net earning on total sales of from 2 to 7 per cent.

2.   The more successful associations have a gross
earning on total sales of from 6 to 14 per cent.

3.   The more successful associations have a gross
earning on wheat sales of 4 per cent or more per dollar.
A margin of less than 4 per cent is insufficient to main-
tain operating expenses and yield satisfactory earnings.

4.   The volume of other grain sales has not been a
sufficient portion of total business for varying margins
to show any correlation to earnings.

5.   The more successful associations have 20 per cent
or more margin for sidelines handled. Acceptable results
may be expected with a margin from 12 to 19 per cent.
Elevators having less than 12 per cent margin have a high
probability of taking a loss on the entire business.

6.   Largest earnings on dollar sales may be expected
when salaries and wages are no less than 40 per cent or no
more than 65 per cent of operating expenses.

7. Largest earnings on dollar of sales can be expected when salaries and wages are no less than 1 per cent and no more than 4 per cent of total sales.

Volume of Business Analysis:

1. Elevator associations with 60 per cent or less of their members giving 50 per cent or more of their business to the association are in the greatest danger of incurring a loss. The largest savings occur when 90 per cent or more of the members are patrons. Patronage dividends are larger per member patron with a given volume of business when a larger per cent of the membership are patrons than when a smaller per cent are patrons.

2. Cooperative elevator associations with 200 to 220 stockholder members make the largest total net earning per $100 of sales. Associations with a membership of from 80 to 200 show acceptable earnings. Approximately six out of ten elevators incur losses when there are less than 80 members.

3. In general, the more successful associations have a capacity turnover of 10 times or more except for houses with unusually large storage facilities where the turnover need be smaller. Associations having a turnover less than four times incur losses more than 50 per cent of the time.

ACKNOWLEDGMENT

The writer wishes to acknowledge the help, suggestions, and constructive criticisms by Professor George Montgomery, his major instructor, during the entire time of the study. The writer also wishes to acknowledge the valuable suggestions and criticisms by Dr. W. E. Grimes, Head of the Department of Economics and Sociology; to Vance M. Rucker, Extension Marketing Specialist, and to Glenn S. Fox, Instructor in the Department of Economics and Sociology, for their help in making the problems more clearly understood.

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