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**THE
COST OF MANUFACTURING
AND
MARKETING SUGAR IN
WISCONSIN**



**BAKKEN
•
BEAL**

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The Cost of Manufacturing and
Marketing Sugar In Wisconsin

*A Study of the Wisconsin Sugar
Industry During the Depression
Years of the Thirties.*

ARV6245

The Cost of Manufacturing and Marketing Sugar in Wisconsin

BY

HENRY H. BAKKEN
University of Wisconsin
and
GEORGE MAX BEAL

FIRST EDITION

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The Cost of Manufacturing and Marketing Sugar In Wisconsin

Henry H. Bakken and George Max Beal

For more than sixty years the growing of sugar beets and the manufacture of sugar has played a part in the agricultural and industrial development of various sections of the state. As early as 1890 some experimental work was done by university agronomists to determine the adaptability of Wisconsin's soil and climate to sugar beet production. Favorable results led to an expansion of the industry because beets seemed well suited to a diversified crop rotation and were advocated in particular areas as a profitable cash crop with which to supplement the more universally grown feed crops, thereby increasing the cash income of the farm and alleviating the risks incident to more specialized agriculture. Unsuccessful attempts have been made to establish the beet sugar industry in several sections of the state, but rather costly experience has gradually restricted the growing of sugar beets to the eastern counties where soil and climate conditions are more favorable to beet culture. In spite of the fact that beets can be produced almost any place in eastern Wisconsin, competition with other crops, relatively low yields, and the high labor demands of sugar beet growing have prevented a concentration of the industry; beet fields are widely scattered from the Wisconsin-Illinois line to the Michigan peninsula.¹

During the past decade, the fifty-fifty type contract between sugar beet growers and processors has completely replaced the direct purchase type of contract which was formerly used in Wisconsin. According to the terms of the fifty-fifty contract, producers and processors share profits and risks equally, and both should, therefore, be aware of the causal forces which determine the costs incident to their mutual enterprise. Hence the primary object of this study is to analyze as concisely as possible the factors which have contributed to the costs and cost fluctuations in the Wisconsin sugar manufacturing industry from 1933 to 1935, inclusive.

Historical Development

The first beet sugar factory in Wisconsin was erected at Fond du Lac in 1869 by two men who had secured their training and equipment in Germany. This plant of Messrs. Otto and Bonnesteel was built at a cost of \$12,000, but after only one year's operation it was dismantled and moved to California, where it began operations at Alvarado in 1870, and became the first successful beet sugar factory in the United States.

In the same year that marked the departure of the Fond du Lac factory a plant was set up at Black Hawk, Sauk County. It had been erected originally at Chatworth, Illinois in 1863, but finding both soil and climate unfavorable the owners moved it to Freeport in the same state and then on to Black Hawk, Wisconsin. During its operations in Illinois

¹ Ellis Lippert, S.: The Tariff on Sugar. Rawleigh Foundation. Freeport, Illinois, 1933. pp. 88-90: See "Crop Competition."

the average output of this plant was from 250 to 400 tons of sugar a season, approximately a week's run in a modern factory. However, operations in Wisconsin were doomed to failure because of the lack of both water and sugar beets, so after a single campaign it followed its predecessor to California.²

The third attempt to establish the sugar beet industry in Wisconsin was made in 1896 when a mill was constructed at Menominee Falls. This factory was supposed to have a capacity of about 350 tons of beets per day, but because of poor machinery and faulty construction it did not produce a pound of marketable sugar. Its failure was an unfortunate incident for the sugar beet industry in Wisconsin because the enterprise had ample farmer support and such an untimely demise had a dampening affect upon everyone interested. The concern finally fell into the hands of some Michigan capitalists who installed new and modern machinery. In 1901 the project was completed and Wisconsin's first successful beet sugar factory was built from the ruins of its worst failure. The successful operation of this factory was followed by the construction of plants at Chippewa Falls, Janesville, and Menominee, Michigan, during the next two years. Finally in 1906 a factory was built at Madison, Wisconsin, to be followed fourteen years later by one at Green Bay.

Thus during the period from 1869 to 1920 nine beet sugar factories started operations at various places in the State of Wisconsin. Out of this group only three are still manufacturing sugar in the period from 1933-35.

The factory of the Superior Sugar Refining Company is the oldest of those now existing. It was erected on an island where the Menominee River flows into Green Bay on the boundary between Michigan and Wisconsin. The original capitalization was \$325,000, but additional investments were made to increase the slicing capacity from 1000 tons per day to 1200 tons, and finally to 1400 tons, together with an electric pulp-drying addition, a crane for unloading beets, and other improvements raised the value of the factory to more than \$1,000,000. This company pioneered the sugar beet industry in Northern Wisconsin and the upper peninsula of Michigan, but secures most of its beets from the former state. It has the largest daily capacity of the three existing factories, but it does not usually operate at capacity because the supply of beets has been small and slow in moving into plant in late years. Beets are secured from various places over an area 350 miles in length and 75 miles in width from Bark River, Michigan, on the north to the Wisconsin-Illinois line on the south.

The factory of the Rock County Sugar Company at Janesville, Wisconsin, was originally built in Dresden, Ontario, Canada in 1902 by Captain James Davidson of Bay City, Michigan, at a cost of \$600,000. In 1904 Mr. Davidson moved his plant to Janesville, Wisconsin, where it was incorporated as the Rock County Sugar Company with a capitalization of \$800,000. The Janesville plant had a slicing capacity of 600 tons per day, which was increased to 900 tons in 1917. It was also equipped with a "Buttner direct heat pulp drier," and was the first company in the United States to dry pulp for commercial purposes. The factory was closed during three years, 1914-17, but with that exception it operated continuously under the same management until 1938.

In 1923 the James Davidson Trust was organized which included the Rock County Sugar Company. Upon the death of his father in 1929, James E. Davidson, his son, assumed directorship of both the Trust and Sugar Company.

² In the manufacture of beet sugar the yearly period of actual operations is called the "campaign" and during this time, which is usually from 30 to 90 days, the plant runs continuously. Therefore, the daily capacity is based upon a 24 hour day.

Though the factory has a capacity equal to that of the Green Bay plant, it normally cuts only about 50,000 tons of beets yearly and secures them within a range of 90 miles from the plant.

The factory at Green Bay was built during the boom period, 1919 and 1920, at a cost of approximately \$1,400,000 with a capacity of 600 tons a day. It is located halfway between the cities of Green Bay and DePere, on the west side of the Fox River.

The factory came into the possession of the Menominee River Sugar Company of Menominee, Michigan, in 1924 and its capacity was increased to 900 tons of beets daily. However, this company's failure in 1930 left the factory to its bondholders; by whom it was leased during 1931 and 1932. After being purchased from the Bondholder's Protective Association in 1933 the concern was incorporated as the Menominee Sugar Company.

This factory has a daily capacity equal to that of the Rock County Sugar Company and less than the Superior refinery, but usually cuts approximately the same yearly tonnage as the latter; most of the beets being grown within 75 miles of the factory and a few as far away as 100 miles.

Costs of Manufacturing and Marketing Sugar in Wisconsin

Prior to 1933, with the exception of one study, attention had been focused primarily upon the problems of sugar beet production and no attempt had been made to determine or analyze the costs of manufacturing or marketing sugar.³

Figures and facts were made available by all sugar manufacturers in the state from 1933 to 1935, inclusive, covering every item of cost involved in the process of manufacturing and marketing sugar. An analysis of these figures revealed the nature and extent of manufacturing costs in the sugar factories of Wisconsin, and indicated the influence of marketing costs upon equitable contractual relations between factories and growers in the same area. In general, the accounting systems of the three factories were so similar that comparable items of income and expense were ascertained without difficulty.

Manufacturing costs characteristically vary greatly in different sections of the country as well as between individual factories within the same section. These differences in manufacturing costs are determined primarily by the variants which exist in the quality of beets in manifold geographical areas, and even in the same area in different years. Factory capacity and the perishability of beets which necessitates the completion of a year's operations within three to five months are also influential factors in determining manufacturing costs. The fact that only three of Wisconsin's nine sugar factories were still operating when this study was made, illustrates the disastrous possibilities which might result from the aforementioned variations.

Figures were secured for all items per 100 pounds of sugar produced and per ton of beets sliced. The unit costs in this report will generally be given "per 100 pounds of" sugar and references to costs per ton of beets and the total costs will be made only when they are of special significance to agricultural producers, when they occasionally serve to facilitate certain verifications and interesting contrasts from the nationwide study of the Beet Sugar Industry in the United States in 1909-14, as published by the Federal Trade Commission, May 24, 1917.

It is expedient to analyze the current material in the form of yearly averages for the three Wisconsin plants because the conditions affecting their operations such as climate, soil, and labor conditions are similar.

³ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May, 1917.

The Federal Trade Commission report is of interest because it provides a basis for comparing the 1932-35 costs with those from 1909-14. It also makes possible a comparison between manufacturing costs in Wisconsin and other beet producing areas for the 1909-14 period. In order to clarify the position of Wisconsin among beet producing areas as shown by the Commission's report of the 1909-14 manufacturing costs, consideration must be given to the unfavorable effect of the abnormal year 1911 on the beet crop. The entire Lakes States beet sugar region was subject to extremely adverse weather conditions during the harvest season of that year, and consequently thousands of tons of beets were bought and paid for, but never converted into sugar. Beets were left to rot in fields and beet sheds throughout the area. A single company was reported to have "lost more than a third of a million dollars during that season." The importance of this bad year in causing increased costs in Wisconsin for the five years studied is revealed by the fact that the 1911 average net cost, not including depreciation, was \$4.486 per 100 pounds of sugar, while the average cost for the same period excluding 1911 was \$4.070. The one year average was \$.41 per 100 pounds of sugar, or 12.5% higher than the average of the other four years. It is apparent, therefore, that while the figures cited are accurate they are influenced to some extent by abnormal conditions and cannot be accepted as truly representative of the long run situation in Wisconsin.⁴

Agricultural Costs

Agricultural costs include a number of separate items which are incurred in procuring sugar beets for factory consumption. The amount paid farmers constitutes the largest single item of the group. There are a number of lesser items: namely, procuring and supervising beet acreage, freight on beets, labor in beet sheds and on dumps, materials purchased for sheds and dumps, procuring and transporting field laborers, agricultural implements such as beet drills, which are sometimes furnished by the companies, and depreciation on sheds, dumps, and scales. The significance of agricultural costs in relation to total costs is revealed by the fact that these costs constituted 61.35% of the total costs incurred by three factories in 1933, 54.35% in 1934, and 53.63% in 1935; the average was 56.1% for the three years.

During 1909-14 the agricultural costs of the five Wisconsin factories then operating amounted to \$3.5033 per 100 pounds of sugar produced, or 71.9% of all costs.⁵ This sum was the largest expense incurred by any beet producing area for purchasing beets and collecting them for processing. High agricultural costs are ordinarily accompanied by high total costs.⁶ According to the Federal Trade Commission's report the group of twelve factories with the greatest total costs had an average agricultural cost of \$2.572 per 100 pounds of sugar. Table I shows that the Wisconsin average agricultural costs were 17 cents per 100 pounds of sugar greater from 1933-35 than the average of the 12 factories which reported the highest total costs in the United States in 1909-14.

The relationship between agricultural costs and other categories of costs are shown in Table II and Figure I and discussed in more detail later. At this point, it might be noted that the proportionate decline of

⁴ Federal Trade Commission: Report on the Beet Sugar Industry in the United States, 1909-14, May 1917, pp. 83-84.

⁵ The Federal Trade Commission uses the term "beet costs" which is synonymous with "agricultural costs."

⁶ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, Table 18, p. 80.

Table I.—Weighted average costs per 100 pounds of sugar and per cent each division is of total costs for three companies, 1933-34 to 1935-36.

Item	1933-34		1934-35		* 1935-36		Three year average	
	Cost per cwt.	Per cent	Cost per cwt.	Per cent	Cost per cwt.	Per cent	Cost per cwt.	Per cent of total
Agricultural costs.....	\$ 2.6757	61.35	\$ 2.5669	54.35	\$ 3.1068	53.67	\$ 2.7374	56.57
Direct operating costs.....	1.1084	25.42	1.1081	23.46	1.4920	25.77	1.1998	24.80
Marketing expenses.....	.4583	10.51	.9151	19.38	.9500	16.41	.7483	15.47
Administration and general costs.....	.1187	2.72	.1329	2.81	.2402	4.15	.1531	3.16
Total costs.....	4.3611	100.00	4.7230	100.00	5.7890	100.00	4.8386	100.00

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Table II.—Agricultural costs per 100 pounds of sugar produced, three Wisconsin companies, 1933-35.

Item	1933		1934		1935	
	Cost per cwt.	Per cent of total	Cost per cwt.	Per cent of total	Cost per cwt.	Per cent of total
Paid farmers for beets.....	\$ 2.1128	78.96	\$ 1.8550	72.27	\$ 2.1588	69.49
Freight on beets.....	.3024	11.30	.3668	14.29	.3914	12.60
Agents salaries and expense.....	.1103	4.12	.1524	5.94	.2312	7.44
Miscellaneous agricultural expense.....	.0501	1.87	.0752	2.93	.1209	3.89
Beet shipping expense.....	.0938	3.51	.1108	4.32	.1907	6.14
Depreciation on beet equipment.....	.0188	.70	.0214	.83	.0316	1.02
Insurance.....	.0022	.09	.0032	.12	.0051	.16
Less earnings and credits.....	-.0147	-.55	-.0179	-.70	-.0229	-.74
Totals.....	2.6757	100.00	2.5669	100.00	3.1068	100.00

agricultural costs to other cost groups after 1933 was sharp despite a very small absolute decrease in 1934 and an actual increase in 1935. The major explanation for this apparent paradox is found in the excessive rise of marketing costs which was largely a result of the processing tax imposed by the Federal Government.

Cost of Purchasing Beets

As previously stated, a large proportion of the total agricultural costs goes to make up the amount paid to farmers for beets. Table II shows that the return to farmers for beets in Wisconsin during 1933 was \$2.1128 per 100 pounds of sugar manufactured while the total agricultural expense for the same year amounted to \$2.6757. In other words, 78.96% of the total agricultural expense was the purchase price of beets. In 1934 the per cent allocated to farmers decreased to 72.5, and in 1935 there was a further decline of 69.5% of all agricultural costs.

These percentage decreases represent, to a large extent, absolute reductions in the amount paid to farmers per 100 pounds of sugar, but they are partially the result of increases in costs such as freight, agent's salaries, and other beet expenses. It is evident that small percentages, and even absolute changes could take place in amounts paid to farmers per 100 pounds of sugar, without having any significant effect upon the price the farmers receive per ton of beets because of the varying amounts of sugar obtained from a ton of beets. In this case, however, there was an actual decrease of 77 cents per ton in 1934, accompanied by a 26 cent decrease per 100 pounds of sugar. By the way of contrast, the following year Wisconsin farmers received an additional 3 cents per ton of beets, but largely because of reduced sugar content, costs rose 30 cents per 100 pounds of sugar.

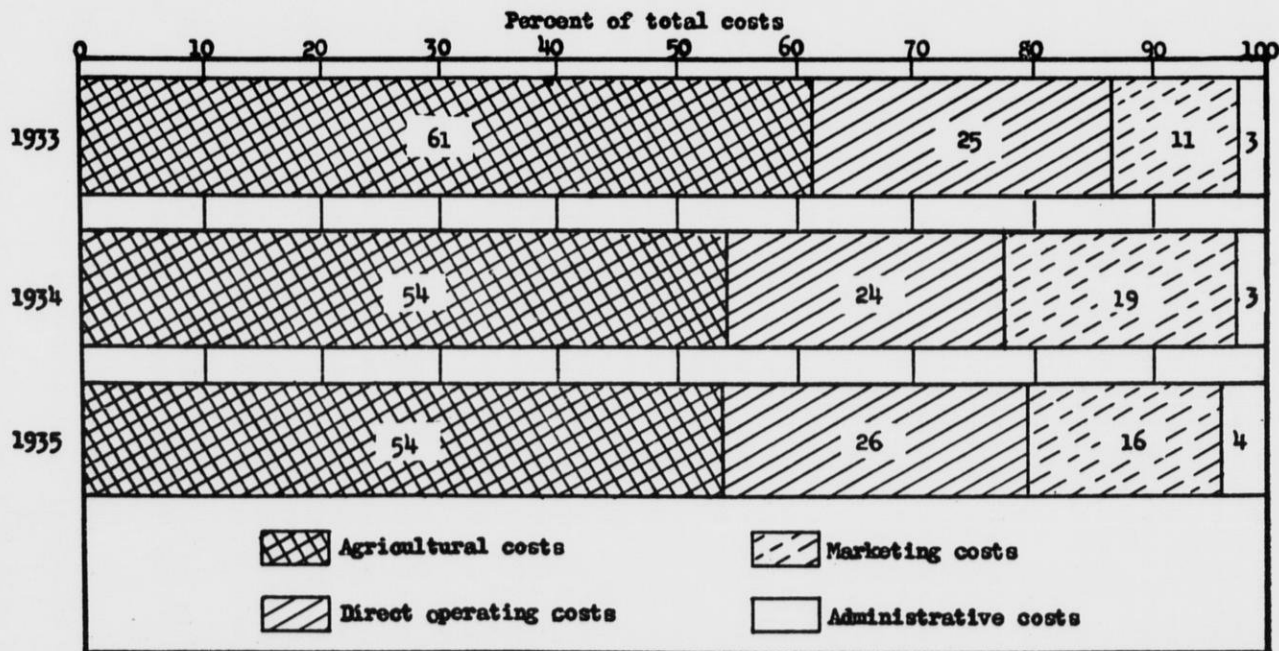
Influence of Sugar Content

The data for each year illustrates one of two important causes of fluctuation in agricultural costs per 100 pounds of sugar refined. The drop of the first year was a result of the contractual relationship between manufacturers and growers under which growers bear half of the expenses incident to storing and marketing sugar. With a few minor exceptions, the drop in price per ton of beets consisted of the farmer's half of \$1.37 per ton processing tax which the companies paid to the federal government. Later, it was returned to the farmers in benefit payments. In the same year, 1934, the pounds of sugar extracted per ton of beets dropped slightly from 261.5 to 256.3; a difference which had some upward influence, but was not significant. The following year the situation was almost reversed. The change in contractual relations was negligible, while the pounds of sugar extracted from a ton of beets dropped from 256.3 to 221.5. This means that 1000 tons of beets were required in 1935 to produce the same amount of sugar as was produced by 862 tons in 1934. Thus, with the price per ton approximately the same, farmers were paid 30 cents more for every 100 pound bag of sugar their beets produced.

The Wisconsin average of 221.8 pounds of sugar procured from a ton of beets in 1909-14 was .3 of a pound less than the average of 1935, but the average of the entire three years from 1933-35 was 248.9 per ton of beets as compared with 221.2 pounds per ton during 1909-14, a 27.7 pound increase, and low sugar content was a major factor in the high agricultural costs in Wisconsin in 1909-14.

The importance of sugar content to processing costs in general, and agricultural costs in particular, cannot be overemphasized. Its significance is revealed by the 1909-14 study in which it was found that the 30 highest cost factories in the United States extracted an average of

Figure 1—Distribution of Manufacturing and Marketing Costs in the Wisconsin Beet Sugar Industry, 1933 to 1935.



*Data from Table I.

221.7 pounds per ton of beets sliced, whereas the 18 low cost plants averaged 299.6 pounds.⁷ The former group was required, during those years, to meet higher agricultural costs because beets in those areas were more difficult to secure and as a result farmers demanded a higher price. Furthermore, beets were likely to be grown greater distances from the factory, thus involving higher freight costs. The differential price demanded by farmers is largely nullified by a fifty-fifty contract because farmers are paid on the basis of the "net proceeds" received for sugar; therefore, each sugar company must pay all its growers the same price for beets. The expense incident to a widely scattered area of beet production, however, is particularly applicable to Wisconsin where freight costs incident to shipping beets into plants have been a very significant item.

Freight Costs

Freight costs on beets ranked second in the allocation of agricultural costs in Wisconsin. These costs averaged \$.3024 per hundredweight of sugar produced in 1933, \$.3668 in 1934, and \$.3914 in 1935. In general, these changes merely reflected increasing price levels incident to the recovery phase of the business cycle, but these facts also emphasize the importance of securing more pounds of sugar per ton of beets. It will be noted that the average freight cost of the group of factories having the highest total costs from 1909-14 was \$.306 per 100 pounds of sugar, while the freight costs of the next group averaged only \$.183 per 100 pounds of sugar,⁸ largely because the beets processed by the latter contained more sugar. It becomes evident, then that high total costs are usually associated with high freight costs. As it happens, few beets are grown near water transportation facilities, and consequently long hauls result in high costs by truck and train. In Wisconsin some beets must be transported many miles; western factories have the advantage of a concentrated beet acreage around the factory. Some companies in irrigated beet growing regions, whose factory capacities are approximately equal to those in Wisconsin, do not ship beets over 30 miles and secure most of their supply from about half that distance. On the other hand, Wisconsin manufacturers have been forced to go far afield in their efforts to obtain an adequate beet acreage. A great many beets must be hauled from a distance of 50 to 75 miles, and a few are grown as far away as 200 miles from the factory. Such conditions inevitably result in higher freight costs on Wisconsin beets than in areas having a greater concentration of beets near the factory for which they are contracted. The situation in Wisconsin is made more serious because the excessive freight costs are to some extent unnecessary, as is indicated by Figure 2.

Effects of Wisconsin's Distribution of Beet Acreage

Figure 2 shows that in competing with each other for beet acreage, all of the three Wisconsin companies were contracting for beets in four of the 30 counties in which beets were raised in 1935,⁹ and farmers in 15 of the remaining counties were raising beets for two companies.

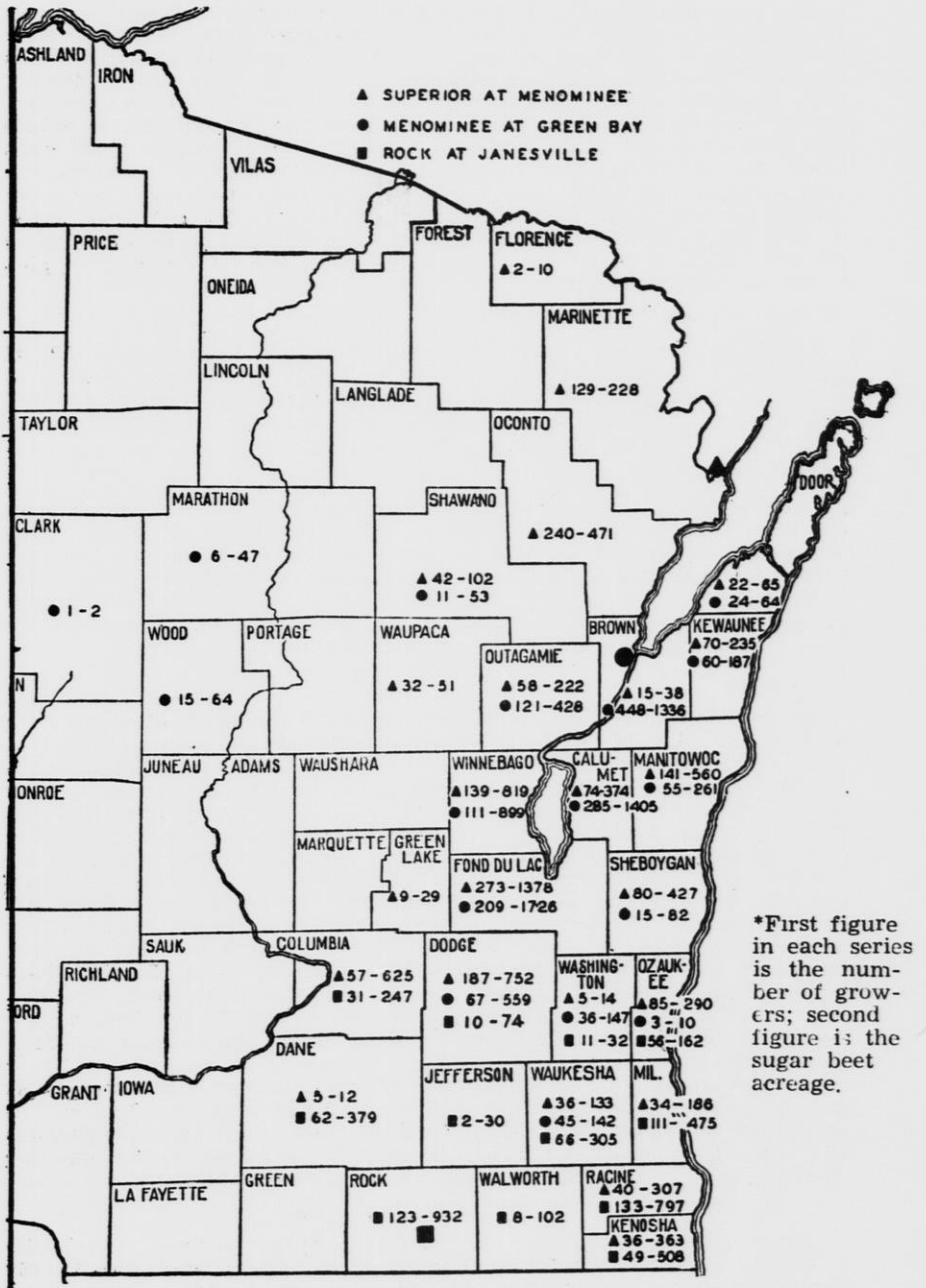
As a consequence of this territorial overlapping, beets were transported

⁷ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, Tables 8 and 32, pp. 25 and 142.

⁹ Record Book of the extension supervisor of sugar beet benefit pay-lished by the Federal Trade Commission, May 1917, Table 31, pp. 139.

⁸ Report on the Beet Sugar Industry in the United States, 1909-14, publications of the A. A. A. for Wisconsin in 1935.

Figure 2.—Number of Growers and Sugar Beet Acreage for Three Companies by Counties, 1935.*



needless miles and freight costs further increased. Another item under the title of beet shipping expense in Table II might well be considered in connection with freight on beets because the costs included are incident to the weighing, dumping, and shipping of beets, together with the construction and maintenance of dumps and conveyors. Such costs differ from freight costs in that they are much less affected by the quantity of beets handled. Consequently, these items of expense on a unit of production basis increased slightly from \$.0938 to \$.1108 in 1933-34, but jumped sharply to \$.1907 in 1935. The primary cause for this abrupt and extensive increase is one which will be prominent in the analysis of all costs which are relatively fixed irrespective of the volume of business. In 1935 a sugar beet blight was prevalent over the whole state and even though the total acres harvested increased from 20,995 in 1934 to 21,235 in 1935, the tons processed declined 27% from 179,788.8 to 131,077.6, while the production of sugar was reduced 38% from 466,603 hundred weights to 290,376 hundred weights.

Agents' Salaries

Agents' salaries and expense increased each year beginning in 1933 at \$.1103 per 100 pounds of sugar, rising to \$.1524 in 1934 and leaping to \$.2312 for 1935. Salaries were raised by the upward movement of wage rates each year. Besides higher salary rates in 1935, unit costs were further increased by reduced sugar production.

Minor Items

The remaining items of agricultural expense as listed in Table II were of minor importance. Such expenses as depreciation on sheds, platforms, and equipment, as well as insurance and miscellaneous beet expenses were quite independent of the volume of production and relatively stable from year to year. Consequently their unit cost would vary in inverse proportion to sugar output, in each case advancing slightly from 1933 to 1934 and increasing approximately 50% in 1935.

Summary

Agricultural costs in the manufacturing of Wisconsin beet sugar were high in 1909-14, both in absolute amount and with reference to most other beet areas of the United States. These costs were materially less in 1933-35, but were still subject to most of the same factors by which they were determined between 1909 and 1914. Even the bad year of 1911 had its counterpart in 1935 when blight conditions cut the sugar production of Wisconsin's factories in half and forced agricultural costs abruptly upward. The predominant items were the actual beet purchase and transportation to factories. These costs averaged 87% of all agricultural expense from 1933-35; fortunately they were dependent upon the volume of beets secured and hence their cost per 100 pounds of sugar was not materially increased by the production declines in 1935. Wisconsin freight costs on beet transportation were influenced upward by the fact that manufacturers had been unable to secure a sufficient beet supply near their plants, and aggravated the situation by encroaching on territory nearer their competitors.

The remaining items in agricultural expense were of importance chiefly because they represent a different kind of cost which is significant in beet sugar manufacturing. They are fixed costs which accrue regardless of the volume of sugar produced and therefore, they reveal the influence of changes in the volume of sugar produced upon unit costs.

Direct Operating Costs

Direct operating costs were exceeded only by agricultural costs in the Wisconsin sugar manufacturing industry from 1933-35, averaging \$1.1998 per 100 pounds of sugar produced and amounting to 24.8% of the total

manufacturing and marketing costs. It is evident from Figure 1 that the percentage of operating to total costs varied from a low of 23% in 1934 to a high of 26% in 1935, with the 1933 figure at a middle point of 25%. The percentage drop of 1934 was not caused by an absolute change in direct operating costs, but was the result of a processing tax of \$.5350 assessed on every 100 pounds of sugar. This tax raised the marketing expense 8%; however, it was partially offset by a 7% decline in agricultural costs per 100 pounds of sugar and consequently direct operating costs declined 2% while the absolute figure remained at \$1.1081 per 100 pounds of sugar compared with \$1.1084 per 100 pounds the previous year.

The amount of direct operating costs varies with individual factories, sugar content of the beets, size of plant, type of machinery and its arrangement within the factory and the duration of the campaign.

Influence of Sugar Content and Duration of the Campaign

Sugar content and the length of the campaign are the two most important items in determining the direct operating cost. The influence of sugar content has been discussed in connection with agricultural costs and is equally applicable here. Beets containing 260 pounds of sugar per ton can be processed at a direct operating cost approximately the same as that incurred in manufacturing beets containing 225 pounds of sugar per ton, but operating costs per 100 pounds of sugar will be much less in the former situation because in a single day's run a factory with a capacity of 1000 tons of beets a day will produce, at almost identical operating expense, an additional 35,000 pounds of sugar.

Table III.—Duration of campaign, daily plant operations and sugar production for three Wisconsin companies 1933-35.

Item	1933	1934	1935	3 year average
Days of operation.....	67.3	61	43	57.7
Tons of beets sliced per day.....	883.84	982.45	1,016.11	941.0
Sugar content.....	16.43	15.9	14.28	15.54
Pounds of sugar per ton of beets.....	261.5	256.3	221.5	248.9
Hundred weights of sugar manufactured per day.....	2,301.16	2,517.71	2,250.98	2,341.82

* Data secured from Company records.

The sugar content of beets, which seems to be determined primarily by weather condition, for Wisconsin from 1933-35, as indicated in Table III, dropped from 261.5 pounds per ton of beets in 1933 to 246.3 pounds in 1934, and a still sharper decrease to 221.5 occurred in 1935. The drop in the first two years was negligible and operating costs were affected only slightly, but the decline of 34.8 pounds of sugar per ton of beets in 1935 was the significant reason for the increase in total operating costs from \$1.1081 per 100 pounds of sugar to \$1.4920 per 100 pounds.

The number of days spent each year in actually making sugar has a double influence on operating costs. It is evident that unit operating costs will vary inversely with the duration of the campaign when the plant is operating near its maximum capacity, but that the opposite situation will exist when production is reduced to partial capacity. During the three-year period studied, Wisconsin sugar factories average 57.7 days for each campaign, cutting 941 tons of beets per day. More significant, however, is the fact that they were in operation 67.3 days the first year, 61 days the second and only 43 the third. These figures indicate that daily factory production was near capacity, while the supply of beets was sharply reduced in 1935. Therefore the increased operating costs in Wisconsin factories for the campaign of 1935 were primarily the

Table IV.—Direct operating costs per 100 pounds of sugar produced by three Wisconsin companies 1933-35.

Item	1933		1934		1935	
	Cost per cwt.	Per cent of total	Cost per cwt.	Per cent of total	Cost per cwt.	Per cent of total
Superintendent and sundry	.1084	2.02	.0257	2.32	.0425	2.85
Labor	.2667	24.06	.3034	27.37	.3442	23.07
Coal	.1774	16.00	.1850	16.69	.2347	15.73
Coke	.0130	1.17	.0169	1.53	.0241	1.62
Limestone	.0485	4.38	.0420	3.79	.0582	3.90
Sugar bags (packages)	.1286	11.60	.1781	16.07	.1684	11.29
General supplies and expenses	.0414	3.74	.0260	2.35	.0517	3.46
Insurance	.0278	2.51	.0221	1.99	.0324	2.17
Maintenance and repair	.1698	15.32	.1302	11.75	.2426	16.26
Depreciation and taxes	.1794	16.19	.1569	14.16	.2666	17.87
Non-comparable items	.0334	3.01	.0218	1.98	.0267	1.78
Total	1.1084	100.00	1.1081	100.00	1.4920	100.00

result of a combination of two factors; there were fewer beets to cut and they contained a lower per cent of sugar.

Labor Costs

Table IV reveals that labor costs constitute the major item in the allocation of operating costs. In 1933 the Wisconsin sugar companies paid out \$.2667 for direct labor required to produce 100 pounds of sugar. \$.3034 in 1934, and \$.3442 in 1935. It is of interest to note that the total 1933 cost of \$.2667 per 100 pounds of sugar was 24.06 per cent of the total operating costs, while the labor cost of 1935 was only 23.06 per cent of the total in that year despite the fact that the absolute figure increased to \$.3442 per 100 pounds of sugar. A percentage change such as this indicates that other items of operating expense were being increased proportionately with the rise in labor costs. Furthermore the upswing of the general price level incident to the recovery stage of the business cycle during these years was a factor necessitating higher wages for labor. Labor costs in Wisconsin sugar factories from 1909-14 averaged \$.3375 per 100 pounds of sugar as compared with an average of \$.2991 for more recent years. A major reason for the relatively high cost for labor from 1909-14 lies in the fact that the average yearly campaign was 73 days during which only 475.8 tons of beets were cut daily, and only 221.5 pounds of sugar were extracted from each ton of beets. The labor cost mentioned above was exceeded during that period only by Ohio and a group of scattered states, which may be partly accounted for by weather conditions adversely affecting these areas in the fall of 1911.¹⁰

Fuel Costs

Coal and coke costs per 100 pounds of sugar increased from 1933 to 1935, but coal, which is the more important by far, shows a minor percentage decrease during the last year included in the study. The reduction in the total fuel bill of \$7,890.99 caused by the short campaign of 1935 was more than counter-balanced by the drop in sugar production and an increase in coal prices; and, as a result, the cost of coal per 100 pounds of sugar went up from \$.1850 to \$.2347. The average fuel costs for Wisconsin from 1909-14 was \$.2479 per 100 pounds of sugar produced. This amount was the highest incurred by any one state in the sugar manufacturing business. These excessive costs, however, were partially the

¹⁰ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May, 1917, pp. 3-5.

result of a 73 day average campaign in which only 173,690 tons of beets were cut and were over 4 cents per hundred weight of sugar greater than the labor costs from 1933-35.

Cost of Sugar Bags

Of the remaining items of expense included in direct operating costs only three were especially significant in determining the amount of the total operating costs. Expenses incurred in purchasing sugar bags differ from the previous items discussed in that they are not influenced by the duration of operations or the sugar content of the beets. While total operating costs remained stationary, the price of sugar bags went up 6 cents each in 1934, and went down 1 cent the next year when total operating costs increased almost 40 cents per 100 pounds of sugar produced.

Repairs and Maintenance

Repairs and Maintenance costs vary from year to year in proportion to the repairs necessary, wage rate changes and the price of materials, but in the long run are relatively stable regardless of the extent of production. Consequently the quantity of sugar produced would be the most vital causative factor involved in determining repair and maintenance costs per hundred weight of sugar. Since size of plant, per cent of capacity operated, length of campaign, and sugar content of beets determine the quantity of sugar manufactured, they also determine maintenance and repair costs per 100 pounds of sugar. Therefore, when repair and maintenance costs in 1934 were divided by 460,746 hundred weights they amounted to \$.1302 per hundred weight, then jumped to \$.2426 when only 290,376 hundred weights of sugar were produced during the next year. Repair and maintenance costs were also much higher during the 1909-14 period than from 1933-35; amounting to \$.2311 per hundred weight of sugar in the former and averaging \$.1722 for the latter.

Depreciation and Taxes

The costs incident to depreciation and taxes are also independent of the volume of output and as a result show a slight decrease in 1934 and increased to \$.2666 per 100 pounds of sugar in 1935 because they represent relatively fixed items of expense and were apportioned to a much reduced sugar production.

Minor Expenses

The minor expense items figuring in operating costs are limestone, general supplies and expense, insurance, and non-comparable costs. Because these are of relatively little importance and seem to be dependent upon a variety of indeterminant causes, it is evident that their expense will vary per hundred weight of sugar with the fluctuation of the yearly output.

Size of Factory Influence

The question of the affect of the size of plant in determining operating costs is one upon which there is a justifiable difference of opinion. In general, there seems to be a "slight difference in favor of the large factory,"¹¹ but at the same time in some localities a small plant is far better adapted to the available supply of beets since additional freight costs might easily counteract advantages incident to greater capacity. Consequently, inefficiencies are more likely to result from failure to operate up to capacity than from lack of sufficient capacity.

¹¹ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, p. 138.

Summary

The trend of direct operating costs, it may be specifically stated that they were less in Wisconsin beet sugar factories from 1932-35 than they were from 1909-14, in which period they were among the highest in the nation. However, a number of factors such as the business cycle, and weather conditions did not influence operating costs either in the same manner or to the same extent in both periods, but the availability of an adequate beet supply, sugar content of beets, length of campaign and wage rates were shown to be vital factors in determining operating costs in the later period as well as the former. As a result, total operating costs were the same in 1934 as in 1933, though at the same time there were compensating movements between the constituent cost items. In 1935, however, a combination of decreased tonnage, reduced sugar content and a higher general price level served to increase unit operating costs materially.

Administrative and General Costs

Administrative and general costs are relatively stable year after year, and when considered on the basis of 100-pound units of sugar, they are determined to a great extent by the quantity of sugar into which they are apportioned. Wage levels are only a minor factor and are less important here than in operating costs because of the fact that administrative workers are fewer in number and their services are of a nature which is less under the direct influence of general wage rates.

Administrative costs were of minor importance in the processing of Wisconsin beets both in 1909-14 and 1933-35 constituting only 4.2 per cent of the total costs in the former period and 3.16 per cent in the latter. Their average cost from 1909-14, \$.2049 per 100 pounds of sugar, was very near the United States average and was exceeded by similar costs in three major beet producing areas of the nation, in spite of the fact that Wisconsin was among the highest cost regions in agricultural and operating expense.

Table V.—Administrative and general costs of manufacturing beet sugar per 100 pounds of sugar produced by three Wisconsin companies 1933-35.

Item	1933		1934		1935	
	Cost per 100 pounds of sugar	Per cent of total	Cost per 100 pounds of sugar	Per cent of total	Cost per 100 pounds of sugar	Per cent of total
Official and office salaries.....	\$.0782	65.88	\$.0831	62.53	\$.1228	51.12
General office expense.....	.0198	16.68	.0192	14.45	.0270	11.24
Legal, audits, taxes.....	.0069	5.81	.0117	8.80	.0547	22.77
Subscriptions, dues, donations	.0059	4.97	.0060	4.51	.0092	3.83
Insurance.....	.0012	1.01	.0018	1.35	.0031	1.29
Miscellaneous and non-comparable.....	.0067	5.65	.0111	8.36	.0234	9.75
Totals.....	0.1187	100.00	0.1329	100.00	.2402	100.00

Figures for 1933-35, found in Table V, indicate that administration costs were materially less than they were from 1909-14, but in the study of the earlier period the individual items were not recorded,¹² and the two lists may not be comparable. However, it is logical to assume that the lists were of approximate similarity because the differences in the to-

¹² Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, Table 18, p. 80.

tal costs can be explained by the fact that 1933 and 1934 were in the depression phase of the business cycle when all costs dropped far below the 1909-14 level. On the other hand, the costs in the earlier years were extremely high due to the abnormal conditions of 1911. By eliminating the influence exerted by these unusual conditions, the results would show almost equal expenditures for administration which indicates that the lists must have been very similar to one another.

Official and office salaries amounted to about 60% of administrative expenditures. The small salary fluctuations from year to year, as indicated by Table V, were of no importance in the determination of unit costs compared with the volume of sugar processed. As an illustration salary costs per 100 pounds of sugar increased one-half cent from 1933 to 1934 because production fell off 66,000 hundred weights and 4 cents (or 50%) when production was further reduced over 150,000 hundred weights in 1935.

Office Expense

From 1933 to 1934 the reduction of total office expense was proportionately greater than the decline in sugar production and the cost decreased .06 of a cent per 100 pounds of sugar, but such was not the case in 1935. Even though total office expense for the three companies fell off almost \$1,000 this reduction was so completely overbalanced by the decreased sugar production that the cost per 100 pounds of sugar amounted to \$.027, an increase of 43% over the previous year.

Audits, Legal Services, and Taxes

The expense incurred by Wisconsin sugar factories for legal services, audits, and the portion of their tax expenditures not allocated to direct operating costs made up 13% of the administrative and general costs from 1933 to 1935. These items were extremely variable and yet were fixed cost items in the sense that their changes were independent of the quantity of sugar produced. Therefore, this particular group of expenses, if based upon units of 100 pounds of sugar produced, show very rapid increases because as the absolute expense went up, sugar production was going down. The major cause for the great absolute increase in 1935 was the tax burden assumed in the purchase of a plant which had been leased previously. As a result, legal audit and tax costs increased from \$.0069 per 100 pounds of sugar in 1933 to \$.0117 in 1934, and to \$.0547 in 1935. This represents a climb from 6% of the total administrative and general costs to 23%.

Subscriptions, Dues, and Donations

The total amount of subscriptions, dues, and donations decreased \$3.88 from 1933 to 1934 and \$85.73 from 1934 to 1935. These reductions are illuminating when it is observed that while they were going down, unit costs were rising each year.

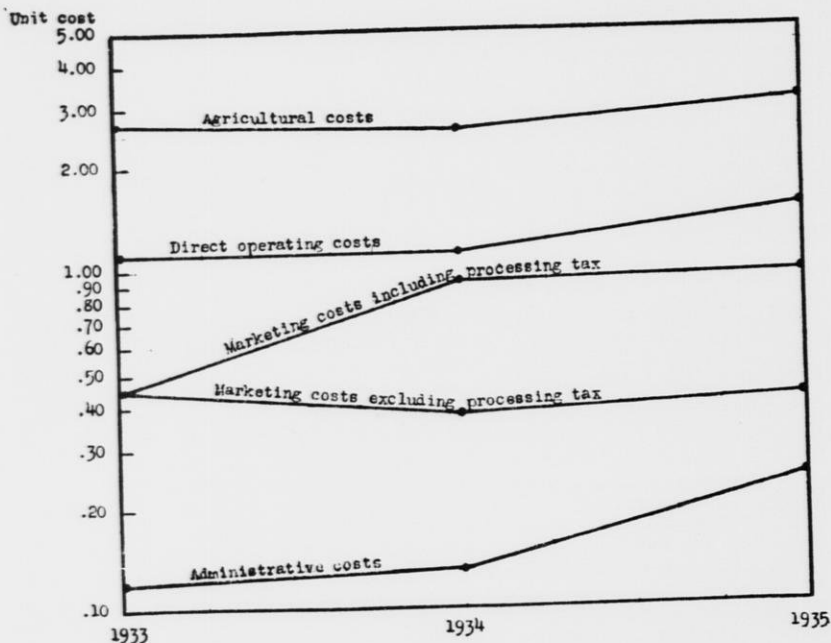
Miscellaneous and Non-Comparable Items

Miscellaneous and non-comparable items together with insurance on administrative buildings and materials amounted to approximately 10% of the administrative and general costs. They increased each year both in absolute amounts and in proportion to the total, but at their highest point in 1935 they averaged only \$.0265 per 100 pounds of sugar.

Summary

Wisconsin compared favorably with other beet manufacturing areas in administrative and general costs from 1909-14, and these costs per 100 pounds of sugar were materially less in the 1933-35 period than they were from 1909-14.

Figure 3—Distribution of Unit Costs of Manufacturing and Marketing Beet Sugar in Wisconsin, 1933-1935.



Administrative and general costs are relatively fixed from year to year and their unit fluctuations are primarily dependent upon the quantity of production because the total expense of administration is not affected by output. Figure 3 emphasizes the influence of production declines upon relatively small fixed costs by revealing that administrative costs per unit increased proportionately more than any other cost group.

Marketing Beet Sugar

The price of sugar in the United States is established by a base-price at New York City, which determines the price quotations in all other areas plus freight from New York. Consequently, the price of sugar will increase as the freight costs from the Atlantic seaboard increase. This system provides a tremendous incentive for local selling of sugar because the local company collects the price differential between the freight costs actually paid and the rate between New York City and the place of delivery.

Sugar is sold ostensibly on a 30 day, 2%, four-way discount contract; one-fourth of the purchase to be paid in 10 days, another fourth in 17 days, another in 24 days, and the final payment in 30 days. In actual practice the time is extended to 42 days by adding a traditional 12-day period for time enroute, even though the sugar is delivered on the day the contract is made. Furthermore, competition has forced a general leniency among the companies in demanding prompt payment. Sugar buyers make it a two—rather than a four—payment plan by taking full discount while paying for half of their purchase in 17 days and the remainder in 30.

The seller does not always insist that the buyer take all of the sugar contracted for, and as an additional inducement the seller guarantees

the buyer against market price decline between the date of sale and date of delivery.¹³ The buyer in turn agrees to accept delivery at the place stipulated in the contract and any change in the destination of the shipment without the seller's consent makes the contract void. The seller takes no responsibility for damage in transit nor for delay caused by any other conditions beyond his control.

Proximity to large population centers, gives Wisconsin, Ohio, and Michigan sugar manufacturers a differential advantage over more remote beet producing regions by reducing marketing costs and yielding higher net returns per 100 pounds of sugar.¹⁴ This advantage is derived primarily from lower freight costs on sugar shipped to wholesale buyers. Local selling is made easier by the fact that the manufacturers can increase their local patronage by truck transportation which is cheaper than the rail rates upon which the prepay (or freight) from New York is based, and permits the manufacturers to pass the difference on to the buyers. For example, if the freight from New York to Sheboygan, Wisconsin, is \$.36 per 100 pounds of sugar, and the local company ships by truck, it can sell cheaper than an outside company shipping in by rail. Outside companies must also pay additional warehousing charges which increase their marketing costs, and thus local companies are benefited.

Wisconsin's sugar manufacturers are not large enough, however, to keep their local clientele supplied with sugar throughout the entire year. As a result, it is almost impossible for the local companies to hold back the sugar supply and secure their share of the profits from anticipated rises in sugar prices because the buyers are anxious to purchase as large a supply as possible prior to the price increase. If the local company does not fulfill the immediate demands of its customers under such conditions they are quite likely to begin securing their entire supply from competing companies.

Wisconsin's small companies are also disturbed by the frequent price changes of the big producers, eight of whom were selling sugar in the Green Bay area in 1935. These strategical maneuvers, known to the trade as "market moves", are designed to give the initiating company a market advantage over others. One of the means of accomplishing this end is to announce a price reduction for a limited period of time to be followed by a price higher than the original quotation. Wholesalers immediately plan to buy large stores of sugar, and the small companies must lose patronage or meet the price reduction. This is particularly significant because in either case the sale of sugar will be tremendous during the low-price period prior to the anticipated rise and if the local companies do not conform with the move they may lose some accounts difficult to regain.¹⁵

Marketing Costs

Marketing costs in Wisconsin (1933-35) differed from all other categories. The individual items which made up marketing costs were dependent upon the volume of sugar sold and therefore unit costs did not fluctuate radically because of production changes. The results of this difference are illustrated by Figure 3, where it can be seen that marketing

¹³ It was at one time customary for cane sugar refiners to guarantee the price against declines, but they no longer do so.

¹⁴ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, Table 33, p. 145.

¹⁵ According to the Tariff Commission's Report on Sugar, 1934, page 106, approximately 80% of all refined beet sugar sold in the United States is sold on the days the market moves are announced.

costs alone failed to increase in response to the production decline of 1935.

Marketing costs differed otherwise in several ways. Under the provisions of the fifty-fifty contract used in Wisconsin, they are to be equally divided between growers and manufacturers. These costs were more than doubled after 1933 by a federal processing tax of \$.53 per 100 pounds of sugar. Finally, in marketing costs alone, labor was a minor item. According to Figure 3, and Table VI the portion of the marketing costs exclusive of tax was quite constant, decreasing only slightly in 1934 and rising again in 1935.

Table VI.—Marketing costs for beet sugar per 100 pounds of sugar produced. Three Wisconsin companies 1933-35.

Item	1933		1934		1935	
	Cost per hundred weight	Per cent of total	Cost per hundred weight	Per cent of total	Cost per hundred weight	Per cent of total
Freight.....	\$.1361	29.71 ¹	\$.1184	31.15	\$.1207	28.96
Discounts.....	.0868	18.95	.0803	21.13	.0948	22.75
Allowances.....	.0616	13.45	.0294	7.73	.0364	8.74
Declines.....	.0883	19.27	.0572	15.05	.0784	18.81
Shipping Labor.....	.0060	1.31	.0052	1.37	.0049	1.18
Insurance.....	.0030	.65	.0033	.87	.0019	.46
Brokerage and Commissions.....	.0425	9.28	.0416	10.94	.0408	9.79
Non-comparable items.....	.0338	7.38	.0447	11.76	.0388	9.31
Total excluding processing tax.....	.4581	100.00	.3801	100.00	.4167	100.00
Processing tax.....			.5350		.5332	
Total marketing costs.....	.4581	100.00	.9151	100.00	.9499	100.00

¹ Percentage figures were calculated on marketing costs excluding the processing tax. It should be observed, however, that marketing costs were more than doubled by the tax.

Effects of Marketing Costs in Wisconsin, 1909-14

It has already been noted that the price of sugar is based upon Atlantic seaboard quotations, and consequently the location of beet sugar factories with respect to consuming centers will be a vital factor in determining the net price received for sugar. The Federal Trade Commission discovered that from 1909-14 the selling price of sugar was much higher in the areas farthest from the seaboard markets, but the cost of selling was proportionately higher also. Therefore, Michigan, Ohio, and Wisconsin received the lowest selling price and the highest net price of all beet producing areas. Wisconsin factories secured a net price of \$4.67 per 100 pounds of sugar from a selling price of \$4.93 while the Utah-Idaho area selling sugar for \$5.08 was only able to obtain a net price of \$4.51. Unfortunately, the constituent items under costs of selling were not listed in the Federal Trade Commission's report and no exact comparison can be made between Wisconsin's cost of selling in 1909-14 and marketing costs in 1933-35.¹⁶ It seems reasonably safe to assume, however, that more items were included in the latter study than in the former. It may also be concluded that the advantage of the proximity of the Lake States beet regions to Atlantic seaboard markets still exists.

Freight Costs on Sugar

From 1933-35 the largest item of cost (excluding the processing tax) was freight on sugar from the factory to the warehouses of the buyers. This item, as set forth in Table VI, was approximately \$.14 per 100

¹⁶ Report on the Beet Sugar Industry in the United States, 1909-14, published by the Federal Trade Commission, May 1917, Table 33, p. 145.

pounds of sugar in 1933, decreased to \$.12 the following year and moved up very slightly in 1935. As a percentage of the total marketing costs, the changes were exactly opposite. Freight costs comprised 30% of the total in 1933, 31% in 1934, and 29% in 1935. Therefore, it is apparent that the absolute decrease of freight costs in 1934 was a much smaller decrease than was experienced by other items of the group and the percentage change went up, while the absolute increase of freight costs in 1935 was much less than that of other items forcing the percentage down. Consequently, we conclude that freight costs, the major expense item of the marketing group, were more unchangeable than the other items. The slight variations were caused by differences in the distance sugar was shipped.

Discounts

Discounts taken ranked second in marketing costs. They remained practically constant the first two years and went up over \$.01 per 100 pounds of sugar in the third year. However, the percentage change increased steadily from 19 per cent to 21 per cent and then to 23 per cent of the total. The significance of this increase in discount expense is primarily its reflection of the improved financial status of the sugar buyers in 1935 which enabled a greater proportion of them to take advantage of the discount to be secured by prompt payments.

Allowances and Declines

These items of expenses show a similar trend from 1933-35, but individual plants were not in complete harmony with the average of the three. Therefore, it is evident that allowance and decline fluctuations were influenced to a considerable degree by chance variables. These costs were determined for the individual plants by market conditions between the time their sugar was sold and the date of delivery. It is evident then, that low costs in allowances and declines depend upon market stability and the judgment or good fortune of the manager. The importance of these items in the Wisconsin industry lies in the fact that they constitute over 20% of the marketing costs and are often affected by the factors beyond management control.

Shipping Labor

The shipping labor expense charged to marketing costs is only that incurred in loading sugar from the company's warehouse after the regular campaign is over. The unit cost was very small each year and the fluctuations were the result of changes in wage rates or efficiency of labor.

Insurance

The trend in insurance costs on sugar merely indicates the change in the proportion of sugar stored to the insurance premium paid. Its amount in any given year is dependent upon the quantity of sugar in storage, its value, and the length of time it remains in the warehouse. Monetary value and time in storage are significant factors because the amount of coverage is based upon the value, and is decreased in total amount as fast as the sugar is sold. Consequently insurance costs are proportionate to market price, quantity and the length of time sugar is stored.

Brokerage and Commissions

These costs were very stable approximating 4 cents per 100 pounds of sugar, and averaging about 10% of the marketing expense. They represent flat rates per hundred weight of sugar sold and are independent of the price received, and therefore, their percentage in any given year is contingent upon the sale price of sugar.

Non-Comparable Items

Marketing costs which were not handled alike in the accounting systems of the Wisconsin companies varied from about 3½ cents per 100 pounds of sugar in 1933 to approximately 4½ cents in 1934; the 1935 cost was slightly less than 4 cents. The items included in this category were advertising and promotions, stationery and printing, bale adjustment, shipping supplies, storage and miscellaneous. It is evident that the term "miscellaneous" may have included any one or all of the above items.

Summary

The costs of marketing were relatively less for the Wisconsin sugar manufacturers than for the specialized producers in western states because of the advantageous location to markets. Under the system of quoting sugar prices at New York plus freight to point of delivery the home market is especially attractive to local manufacturers because the allowance for transportation is greater than its actual costs. The benefits derived from the low marketing costs were offset to some extent by the inability of Wisconsin companies to furnish the local trade with their full yearly requirements.

Grower Contracts

Grower contracts are drawn up by the sugar company officials who have been assisted in recent years in Michigan and several western areas by farmers representing Beet Grower's Associations. Each company has but one contract which is offered indiscriminately to growers of the area. Because the farmer is free to either accept or reject the contract, its provisions must be attractive enough to procure an adequate acreage, insuring a sufficient supply of beets for a year's operation. Consequently, the farmer's bargaining power is based largely upon the profitableness of other possible uses for his soil, and this fact accounts for some companies paying higher prices for beets than others.

As a result of crop competition for the soil, Wisconsin farmers have usually received relatively high prices for beets, but have not secured correspondingly high beet incomes because of comparatively low yields.

The Flat Rate Contract

Prior to 1931 all sugar beet contracts provided for the purchase of beets at a flat rate per ton. The title was then passed to the manufacturer who assumed all risks and kept all profits. In addition to a price stipulation, the contract contained provisions concerning the growing and delivery of beets. With a few exceptions, the flat rate contracts offered by different companies were essentially alike; this type is still being used by a number of western companies. The agreement provides that the grower shall prepare the land, block, thin, cultivate, irrigate, harvest, and deliver a specified number of acres of beets. The company assumes no liability in the failure or partial failure of a crop. The grower agrees to use seed furnished by the company at a stipulated price and plant a specified number of pounds on each acre.

Beets are to be harvested only when directed by the company up to a definite date early in October, but may be harvested immediately after that date without order. Usually the company is not required to accept beets after December 1. Growers agree to top and deliver beets in accordance with company standards and to accept the tare reductions determined at the delivery stations by company employees. The company has the option of refusing diseased, frozen or damaged beets, and in some cases, beets having less than 12% sugar content or less than 80% purity.

Recently there has been a change in the original flat rate basis of determining prices; the newest trend has been toward a price for beets based upon net returns to the company for 100 pounds of sugar sold, and varying with the average sugar content of the beet. Under such a con-

tract, when the net return on 100 pounds of sugar is \$5.00, a farmer will receive \$5.90 per ton for his beets if they contain 14% sugar and \$7.74, if their sugar content is 18%.¹⁷ This change is a distinct movement toward a more equitable price for beets because of the importance of sugar content in limiting the quantity of sugar contained in a ton of beets.

Other provisions of the contract specify dates and methods of payment which vary somewhat with different companies. Usually the initial payment is made about the 15th of November of the current year and final settlement prior to October of the next year. Tests for purity and sugar content are made by company chemists, but producers' associations have secured the right to employ check chemists satisfactory to the company, and also to employ reliable men to inspect the work of the company's tare and weight men at the beet receiving stations.

Beets must be delivered in wagons sufficiently tight to prevent the loss of dirt shaken off in the dumping process before the wagon is weighed out. The company has the privilege of sampling a grower's beets and checking on his cultural practices at any time during the season. In some cases, companies reserve the right to cultivate and harvest the crops of recalcitrant growers and assess service charges against these particular beet crops. Finally, the provisions of the contract cannot be "waived, changed, or modified" by any agent of the company.

The Fifty-Fifty Contract

The beet sugar manufacturing industry encountered serious difficulties during the major post-war depression of the 30's, especially in areas where the price of beets had been held up by the competition of other relatively profitable crops. The price of refined sugar tumbled so rapidly that companies were wary about contracting for beets at any price. Some preferred to cease operations entirely, and while others were willing to operate they would promise no definite price for beets. Farmers, however, were unable to shut down when conditions became bad, and although the price of beets might be very low they were a cash crop at a time when farmers were in desperate need of money. A new contract was evolved. It was based upon the supposition that since the farmers furnish the raw material, and the manufacturers provide the plant and equipment, they should become partners in producing beet sugar, sharing equally the costs and profits.

In keeping with this premise, the most important provision of the original fifty-fifty contract stipulated that the price paid for beets should be determined by dividing the number of tons of beets delivered into one-half of the total net proceeds from the sale of sugar, pulp, and molasses processed. "Average net proceeds shall be the net price received by the company from the sale of such products after deductions for storage, trade discounts, insurance, credit risks, brokerage, commissions, allowances, and transportation costs from the factory to the point of sale, not including, however, costs of loading on cars, on trucks, or losses from bad debts."¹⁸ The costs mentioned above have already been discussed as marketing costs. It will be well to recall, however, the fact that their exclusion from "average net proceeds" was based upon the idea that after reaching the warehouse, sugar is the joint property of the grower and the manufacturer and each should assume half of the marketing expenses.

¹⁷ Great Western Sugar Company Contract, 1935.

¹⁸ Provision "nine" of the original fifty-fifty contract of the St. Louis plant of the Great Lakes Sugar Company, April 1, 1931.

There are differences between the contracts offered by various companies, although they are all based upon the same fundamental concept. Some include pulp and molasses receipts in determining "net proceeds," while others include only one of the two, and still others do not include either one. Usually, but not always, provision is made in the contract for insurance against fire loss, and companies which deduct marketing costs prior to calculating "net proceeds" may or may not specifically designate in their contract the item to be included in marketing costs. Time of payment to growers is not uniform, but an initial payment is always advanced in December, and subsequent remittances made at various intervals until October of the following year. The remaining provisions concerning the supervision of beet production, time and methods of harvest, and tare deductions were largely carryovers from the flat rate contract, and need no further discussion.

Summary

Sugar beet grower contracts are typical of a group of contracts dealing with cash crops whose bulk or perishability necessitate processing near the areas of production. Because of limitations in plant capacity, and perhaps also of market facilities, these crops are contracted prior to their production and are grown and delivered according to legal agreement.

Two types of contracts exist in the beet sugar industry, one of which is of recent origin. The first in point of time, but the second with reference to extent of present usage is the flat rate contract. It is a direct purchase contract under which the ownership of sugar beets is charged for a specific consideration, and after which the purchaser assumes all risks and collects all profits.

The contract in general use in many sugar beet areas of the United States, and universally in Wisconsin, is the fifty-fifty contract which originated in the West and was introduced in the Lake States region at St. Louis, Michigan in the spring of 1931. This partnership contract is based upon the *a priori* assumption that the grower and the processor contribute equally to the production of beet sugar.

There are numerous minor variations among the contracts offered by different companies, but within the two divergent types the contracts are fundamentally alike.

General Conclusions

The beet sugar manufacturing industry is characterized by a large initial investment in plant and equipment, by fixed costs which are high compared with variable costs and by a relatively short period of intense activity each year. These characteristic features of the industry result in unit costs which are extremely sensitive to the quantity of sugar produced. Consequently unit costs are determined primarily by the amount of the annual production of sugar at any given factory.

In the foregoing analysis it is shown that manufacturing costs in Wisconsin are relatively high compared with western beet growing regions, but were lower from 1933 to 1935, than they were from 1909 to 1914.

The comparatively high manufacturing costs in Wisconsin are the result of several conditions. Beet production is not intensive because there are too many competing crops, and beets are often shipped long distances to factories, a situation in the state which has been exaggerated by overlapping inter-factory competition. Sometimes the acreage secured is so near the minimum required to justify the operation of factories that a slightly reduced yield per acre abnormally shortens the campaign. A two or three per cent drop in the sugar content of the beets will appreciably reduce production and sharply increase unit costs when operations are carried on so near the margin.

Wisconsin is advantageously located with respect to sugar markets, and

marketing costs are relatively low, but unfortunately marketing costs make up only about 15% of the total cost.¹⁹ Furthermore, their small size makes it difficult for Wisconsin companies to hold their adjacent market because buyers find it necessary to obtain part of their supply elsewhere which at times requires judicious handling of orders to retain the goodwill of the trade on a seasonal patronage basis.

Wisconsin also has a good market for pulp and molasses. The profits from these by-products contribute materially toward the equalization of unfavorable manufacturing costs.

Thus it appears that variations in manufacturing and marketing costs are caused primarily by factors which are independent of the actual technology of the manufacturing process. Therefore the trend of future costs in the Wisconsin beet sugar industry depends upon the degree of success attained in increasing sugar content and yield of beets, in materially reducing freight costs by securing a more concentrated beet acreage about the factories and eliminating needless overlapping inter-factory competition, and finally by maintaining the present advantages afforded by proximity to consumer markets.

¹⁹ Table I, page 9.