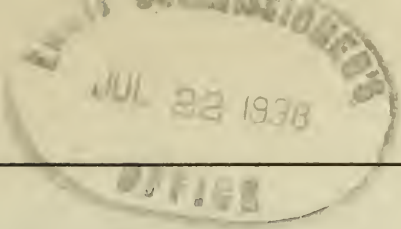


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COSTS AND RETURNS IN APPLE PRODUCTION ROUVILLE COUNTY, QUEBEC

A. GOSSELIN

MARKETING SERVICE
ECONOMICS DIVISION

UNDERTAKEN IN CO-OPERATION WITH

THE RURAL ECONOMICS SERVICE
DEPARTMENT OF AGRICULTURE, QUEBEC



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Costs and Returns in Apple Production Rouville County Quebec¹

SUMMARY

The average size of the thirty farms was 70·6 acres, of which 16·7 acres were in bearing orchard, 8 acres in none-bearing orchard, 14 acres in other crops, and 31·9 acres in pasture, wood, and rough land.

Financial Returns.—The average farm capital was \$18,591. For the six-year period 1929-34, cash receipts averaged \$3,068, while cash expenses totalled \$1,540, leaving an average cash income of \$1,528. The value of products supplied by the farm plus the rental value of the house occupied by the operator was estimated at \$441, which added to the cash income gave a total of \$1,969, for what is frequently called family farm earnings.

When non-cash items, including changes in inventory and unpaid family labour, are considered the gross receipts averaged \$3,138 per farm, and the expenses \$2,106. The average farm income was \$1,032, and the labour income \$102.

Cost of Producing and Marketing.—For the three-year period 1932-1934, the average cost of producing apples amounted to \$89 per acre or \$1.47 per barrel with an average yield of 60·7 barrels per acre.

The average marketing cost was 49 cents per barrel. The total cost of producing and marketing apples averaged \$1.96 per barrel while the average price received was \$2.23, leaving a net profit of 27 cents per barrel. The average cash expenses for producing and marketing apples amounted to \$1.01 per barrel.

Man Labour Requirements.—The average man labour requirements in the orchard prior to harvest was 63·7 hours per acre and 54·3 hours for picking and hauling to the fruit house, making total man labour requirements of 118 hours per acre for growing and harvesting apples. The rate per man per day for picking was from ten to twelve barrels and for grading by hand and packing from twelve to fifteen barrels.

¹Grateful acknowledgements are made to apple growers of Rouville County for their co-operation in providing basic data on their farm and orchard enterprises; also to Messrs. R. Lécuyer and J. A. Martin of the Rural Economics Division, Department of Agriculture, Quebec, and F. Blanchard of the Staff of the Economics Branch, Ottawa, for assistance in collecting data.

Preliminary extracts from the study have already appeared in the *Economic Annalist*, June and August, 1936.

INTRODUCTION

While the production of apples is a minor enterprise in the province of Quebec taken as a whole, it is a major undertaking in the districts where apples are produced on a commercial basis, and it is about the only source of income on many farms. The trend of apple production from 1901 to 1931 is shown in Table 1. The very severe winter of 1916-17 was responsible for most of the reduction shown in 1921. The census of 1931 records an increase over 1921 in both bearing and non-bearing trees, but another disastrous winter was experienced in 1933-34 and it is likely that a further setback will be recorded in 1941.

TABLE 1.—NUMBER OF APPLE TREES, PRODUCTION AND VALUE OF THE APPLE CROP IN THE PROVINCE OF QUEBEC, 1901-1935

Apple Trees	1901	1911	1921	1931
	No.	No.	No.	No.
Apple trees, total.....	2,256,752	2,112,647	1,416,820	1,618,936
Not of bearing age.....	780,025	859,812	560,775	636,936
Of bearing age.....	1,476,727	1,252,835	791,481	911,794
	1900	1910	1920	1930
Production—Bushels.....	2,025,113	1,482,095	1,002,136	981,009
Value of fruits.....\$.....	(not given)	3,169,391	4,837,044	3,769,273

Although apples are produced in almost every section of the province, the great bulk of commercial production is concentrated in ten counties of the Montreal district and Eastern Townships, as shown in Table 2. In 1930 over 57 per cent of the total crop of the province was produced in that section, and Rouville County ranked first with 47 per cent of the production reported by these counties.

TABLE 2.—APPLE TREES, PRODUCTION AND VALUE OF APPLES REPORTED BY TEN COUNTIES OF THE PROVINCE OF QUEBEC

County	1931		1930	
	Non-bearing trees	Bearing trees	Production	Value
	No.	No.	Bushels	\$
Rouville.....	142,553	146,283	265,772	263,713
Deux-Montagnes.....	26,636	63,704	66,459	63,500
Chateauguay.....	25,550	47,181	62,655	60,752
Montreal and Jesus Islands.....	13,720	34,533	53,156	56,488
Huntingdon.....	30,149	43,012	37,371	36,162
Napierville.....	11,597	25,444	25,772	22,703
Bagot.....	13,697	26,468	20,793	20,480
Missisquoi.....	32,916	20,546	13,615	10,372
St-Jean.....	14,603	15,097	13,088	11,281
Shefford.....	20,607	27,707	11,631	11,432
Total.....	332,028	449,975	570,312	556,883

Rouville County is the oldest district of the province of Quebec in which the development of apple production on a commercial basis has taken place.

This area is located some 35 miles from the city of Montreal and includes the three parishes of St-Hilaire, Rougemont, and Abbotsford. Most orchards are situated on the slopes of three typical mountains which dot this region. They are established on land suitable only for the production of apples and certain other fruits and vegetables, although in some instances farms include a certain acreage of flat land at the base of the mountain which supplies hay and grain for live stock.

Scope of This Study

The first part of this report presents the financial returns of orchard farms in Rouville County as indicated by a farm survey conducted for the six consecutive crop years 1929 to 1934 inclusive, while the second part summarizes supplementary data collected through an enterprise cost study on these farms, during the three years 1932, 1933, and 1934 only, for the purpose of securing more specific information on the cost of producing and marketing apples in that district.

An analysis of each individual farm included in this study showing the average financial returns for six years 1929-34 has been summarized in Appendix I while the cost of producing and marketing apples for three years, 1932-34, has been recorded in Appendix II.

Part I.—Financial Returns of 30 Orchard Farms in Rouville County, Quebec, for six years, 1929-1934

This study coincides with the economic depression experienced following 1929 and shows the trend of orchard farming throughout that time. While the financial returns of these farms varied from year to year with the size of the apple crop and decreased gradually with falling prices, the low returns in 1934 were due more particularly to the heavy loss of apple trees which were killed or badly injured by the severe winter conditions of 1933-34.

The farms selected for this study are quite representative of this type of farming in the district, although they vary in size from 8 to 230 acres. The average size was 70.6 acres, of which 16.7 acres were in bearing orchard, 8 acres in non-bearing orchard, 14 acres in other crops, and 31.9 acres in pasture, wood and rough land. These farms are highly specialized in growing apples and on most of them only a small portion of the total income is derived from the sale of live stock products, maple syrup, small fruits and vegetables.

The financial summary is presented in Table 3. The farm capitalization which averaged \$18,591 is rather high, for the reason that the first inventory taken in 1929 was not subsequently lowered, except to the extent of the depreciation on buildings and equipment, and changes in the value of live stock, feed and supplies. Farm values in the meantime had declined appreciably. Had a new inventory been taken in 1934 on the basis of farm value then prevailing, a big decrease in farm capitalization would have been recorded due both to price deflation and deterioration in orchards following the disastrous winter of 1933-34. Of course, the farm income and cash income are not affected by a difference in capitalization, but this is not the case for labour income which represents farm income less interest on capital investment—the rate used in this instance being 5 per cent. The higher land valuation recorded for the three-year period 1932-34 is due to the substitution of four farms in order to keep the same number of records for the whole period.

For the six-year period gross receipts averaged \$3,138 per farm. Receipts from apple sales averaged \$2,718 or 86.6 per cent of total receipts. The highest receipts were obtained in 1930 and averaged \$3,849 per farm. The lowest receipts were secured in 1934 and averaged \$1,942 per farm. Total expenses including decreases of inventory averaged \$2,106 per farm for the six-year period. The item "other expenses" includes all expenses not otherwise listed, such as seed, feed, trees, apple containers, marketing expenses, and miscellaneous expenses.

The farm income is the amount remaining from the year's gross receipts after total farm expenses including an allowance for unpaid family labour and depreciation on buildings and equipment have been deducted. It is what is left to cover wages for the operator's labour for the year and interest on the capital invested in the farm. The average farm income for the six-year period was \$1,032, reaching a peak in 1930 with \$1,412, and a low point in 1934 with \$701.

The labour income is computed by deducting from the farm income interest on the total farm investment (calculated at 5 per cent in this survey) and represents the return to the operator for his labour and management,—in addition to which he receives food, fuel and housing derived from the farm. For the six-year period the operator's labour income averaged \$102. Labour income recorded on these farms averaged \$419 in 1929, \$474 in 1930 and \$376 in 1931. From 1932 to 1934 there was a sharp decline in the operator's labour income which averaged minus \$8 in 1932, minus \$139 in 1933 and minus \$518 in 1934. This means that after deducting total expenses from gross receipts profits were not sufficient to either pay as much as 5 per cent on the investment or any wages to the operator for his labour. As shown in Appendix I there was a wide range in individual operator's labour income, the highest being \$3,374 and the lowest minus \$1,782.

The average value of farm perquisites and use of dwelling was estimated at \$441.

TABLE 3.—FINANCIAL SUMMARY OF 30 ORCHARD FARMS IN ROUVILLE COUNTY, QUEBEC, 1929-1934

Crop year	1929-1930	1930-1931	1931-1932	1932-1933	1933-1934	1934-1935	Six-year average 1929-1934
	\$	\$	\$	\$	\$	\$	\$
<i>Capital—</i>							
Land.....	11,348	11,348	11,348	11,690	11,690	11,690	11,519
Buildings.....	5,323	5,170	5,030	4,940	4,797	4,675	4,989
Machinery.....	1,607	1,510	1,429	1,484	1,402	1,282	1,453
Live stock.....	668	634	541	452	426	418	523
Feed and supplies.....	71	94	130	122	124	100	107
Total Capital.....	19,017	18,756	18,478	18,688	18,439	18,165	18,591
<i>Receipts—</i>							
Apples.....	2,899	3,282	3,053	2,995	2,394	1,685	2,718
Other crops.....	165	123	44	59	39	42	79
Livestock sales.....	161	94	52	35	14	47	67
Livestock products.....	187	135	101	72	75	72	107
Other receipts.....	211	115	116	24	50	67	97
Inventory increase.....	79	100	92	90	29	29	70
Total Receipts.....	3,702	3,849	3,458	3,275	2,601	1,942	3,138
<i>Expenses—</i>							
Unpaid labour.....	318	387	304	136	153	117	236
Hired labour.....	600	561	501	560	507	411	523
Spray material.....	69	82	85	117	112	90	92
Fertilizer.....	115	158	141	104	68	84	112
Taxes.....	110	99	98	102	93	95	99
Capital expenditures.....	85	153	104	97	43	41	87
Other expenses.....	726	635	541	914	547	400	627
Inventory decrease.....	309	362	384	317	294	312	330
Total Expenses.....	2,332	2,437	2,158	2,347	1,817	1,550	2,106
Farm income.....	1,370	1,412	1,300	928	784	392	1,032
Interest at 5 per cent.....	951	938	924	936	923	910	930
Labour income.....	419	474	376	-8	-139	-518	102

Effect of the Depression.—An analysis of the financial summary presented in Table 3 reveals what happened to farm income during the depression period

and also indicates the adjustments farmers made to keep within their income. Receipts from the sale of apples held up fairly well until 1933 but there was a heavy decline in returns from other sources. The latter which totalled roughly \$800 per farm in 1929-30 declined steadily to about \$200 in 1933-34. Maintenance of apple prices at relatively favourable levels compared with the prices of many other farm products apparently resulted in a concentration of effort on apple production and a lessening of interest in other products. This is in sharp contrast to the practice adopted by producers of a crop such as wheat whose income from this source was drastically cut and who as a result turned to the production of dairy and live stock products.

With the decline in income, expenses too were curtailed—though not in direct proportion. Less was spent for labour and for miscellaneous items. Capital replacements, repairs and such like suffered, but it is noticeable that the expenditures for spray material and fertilizer were in the main, well maintained. Considering the lower prices for such products during the period it is evident that with the exception of fertilizer purchases in 1933-34, the quantities of these products applied increased during the period of the depression. Results for 1934-35 are hardly comparable due to the heavy weather killing experienced during the preceding winter.

Cash Income.—Cash income is frequently considered by farmers as the most important measure of returns for it is out of this that they must pay cash operating and living expenses. During periods of depression cash income assumes even more significance. There are, however, as already noted, a number of items of expense, which though they may not call for cash outlay in any given year, and can, therefore, be deferred during a period of depression, must nevertheless be paid in the long run if the business is to be carried on without impairment of capital and loss of wages. These include depreciation, decrease in inventory and unpaid family labour. One of the disadvantages in using cash income as a means of comparison is that all farmers are not similarly placed with respect to the use of family labour. Nevertheless cash income does indicate what is available to meet cash expenses and it explains why farmers can carry on through years of adversity when farm income and labour income records indicate losses. The net cash income of these farmers (Table 4) averaged \$1,528 for the six-year period, the individual cash income ranging from \$158 to \$5,006.

The estimated value of the products supplied by the farm amounted to \$170, while the rental value of the house occupied by the farm family was estimated at \$271, making a total amount of \$1,969 available for what is frequently called total family farm earnings.

TABLE 4.—CASH INCOME OF 30 ORCHARD FARMS IN ROUVILLE COUNTY, QUEBEC, 1929-1934

—	1929	1930	1931	1932	1933	1934	Six-Year average
	\$	\$	\$	\$	\$	\$	\$
<i>Cash Receipts—</i>							
Apples.....	2,899	3,282	3,053	2,995	2,394	1,685	2,718
Other receipts.....	724	467	313	190	178	228	350
Total.....	3,623	3,749	3,366	3,185	2,572	1,913	3,068
<i>Cash Expenses—</i>							
Hired labour.....	600	561	501	550	507	411	523
Spray material.....	69	82	85	117	112	90	92
Fertilizer.....	115	158	141	104	68	84	112
Taxes.....	110	99	98	102	93	95	99
Capital expenditures.....	85	153	104	97	43	41	87
Other expenses.....	726	635	541	914	547	400	627
Total.....	1,705	1,688	1,470	1,884	1,370	1,121	1,540
Cash income.....	1,918	2,061	1,896	1,301	1,202	792	1,528

Part II.—Cost of Producing and Marketing Apples on 30 Orchards in Rouville County, Quebec, for three years, 1932, 1933 and 1934

Size of Orchards.—Included with the summary of operating costs, Appendix II, is a comparison of the size of orchards which indicates a variation from 4.2 to 50.7 acres with from 225 to 3,533 bearing apple trees. The average size of bearing orchard was 17.4 acres with an average of 64.6 trees per acre. In addition there were 8 acres of non-bearing orchard.

Age of Trees.—In 1933, twenty-seven per cent of the trees were between 10 and 19 years of age, 58 per cent between 20 and 29 years, 12 per cent between 30 and 39 years and 3 per cent over 40 years.

Apple Varieties.—Of the bearing trees 48 per cent were Fameuse (Snow), 28 per cent McIntosh, 10 per cent Duchess, 7 per cent Wealthy, 4 per cent Yellow Transparent and the balance, that is 3 per cent, was made up of St. Lawrence, Melba, Scarlet Pippin and a few odd varieties.

A survey made in 1933 by the provincial Department of Agriculture for the Montreal district shows that of a total of 320,000 apple bearing trees 37 per cent were Fameuse, 20 per cent McIntosh, 22 per cent of early fall varieties and 21 per cent of other varieties, while of a total of 264,884 non-bearing trees, 36 per cent were Fameuse, 48 per cent McIntosh, 7 per cent of early fall varieties and 9 per cent of other varieties.¹

Since the Fameuse trees were killed in a much greater proportion than the McIntosh during the winter 1933-34, and the young plantations of the last few years contained also a larger proportion of McIntosh trees, it is likely that the ranking order of the two main varieties grown in this district, Fameuse and McIntosh, will be changed in the future.

Cost of Producing Apples.—The accurate determination of the cost of production of apples, as of any farm product which is produced in combination with other farm enterprises, is very difficult. There are numerous joint costs which have to be allocated by somewhat arbitrary methods; for instance, man and horse labour, use of machinery and buildings, overhead costs, and so forth. Man labour is one of the most important single items of cost of producing apples and also the most difficult to allocate. The orchard business provides work for about eight months of the year and the operator has to stay on the farm the whole year whether he has some work to do or not. It is obvious that on a small orchard of between five and ten acres the operator's labour estimated at what it would cost to hire a man for the year to take his place makes the labour charge per hour of productive work much higher than the current rate for hired labour. Nevertheless the orchard business being the major enterprise must bear the largest share of this charge.

The same thing applies to horse labour. On most orchard farms two horses are required for spraying, mowing the orchard, and hauling apples. They remain idle for the greater part of the rest of the time, and it costs about as much to keep them as if they work every day.

The cost of producing apples is presented in Table 5. The average investment per farm in land and trees was \$9,040 or \$519 per acre of bearing orchard and \$8 per bearing tree; the investment in buildings (fruit house only) was \$716 per farm or \$41.11 per acre; the investment in orchard equipment was \$582 per farm or \$33.45 per acre. The overhead and growing costs per acre vary little from year to year unless something quite unusual occurs. In 1934 the growing costs per acre were somewhat lower than 1932 and 1933 because of the large number of bearing trees killed during the previous winter.

Harvesting costs are closely related to the size of apple crop. A larger yield means more labour for picking and handling the crop. However, since the harvesting costs amounted only to 16.4 per cent of the total cost of production

¹ Annual Report of the Quebec Pomological Society, 1934, page 20.

per acre, a big crop of apples is usually produced at a much lower cost per barrel than a small crop.

The interest charge on orchard investment is an important item of cost. It amounted to 33·3 per cent or exactly one-third of the total cost of production per acre for the three years.

The crop of 1932 was a good one. The yield averaged 81·6 barrels per acre on the thirty farms and the cost of production \$1.18 per barrel. The average yield of 67·9 barrels per acre in 1933 was higher than the average yield of 60·7 barrels per acre for the three years 1932-34 and the cost of production per barrel averaged \$1.33. The crop of 1934 was nearly a failure as a result of heavy loss of bearing trees during the previous winter; the average yield per acre was only 32·6 barrels and the average cost of production \$2.48 per barrel. This increased the average cost of producing apples for the three years 1932-34 to \$1.47 per barrel.

TABLE 5.—COST OF PRODUCING APPLES PER ACRE AND PER BARREL ON 30 ORCHARD FARMS IN ROUVILLE COUNTY, QUEBEC, 1932-1934

Item	1932	1933	1934	3-year average	
				Per acre	Per barrel
	\$	\$	\$	\$	
<i>Overhead Costs—</i>					
Taxes.....	4.80	4.67	4.67	4.72	
Repairs to buildings and equipment.....	1.42	1.13	1.09	1.21	
Miscellaneous.....	2.04	1.88	1.84	1.92	
Total overhead costs.....	8.26	7.68	7.60	7.85	0.13
<i>Growing Costs—</i>					
Man labour.....	16.17	15.73	15.65	15.85	
Horse labour.....	4.52	4.41	4.04	4.32	
Spray material.....	6.21	5.91	4.68	5.60	
Fertilizer.....	3.37	2.93	3.58	3.29	
Manure and straw.....	3.38	3.14	2.14	2.89	
Total growing costs.....	33.65	32.12	30.09	31.95	0.53
<i>Harvesting Costs—</i>					
Man labour.....	17.09	14.94	8.33	13.45	
Horse labour.....	1.35	1.22	0.80	1.12	
Total harvesting costs.....	18.44	16.16	9.13	14.57	0.24
Total cost exclusive of depreciation and interest....	60.35	55.96	46.82	54.37	0.90
Depreciation charge on building and equipment....	5.28	4.94	4.75	4.99	0.08
Interest charge on investment at 5 per cent.....	30.32	29.37	29.24	29.64	0.49
Total cost of production per acre.....	95.95	90.27	80.81	89.00	
Cost per barrel.....	1.18	1.33	2.48	1.47	1.47
Yield per acre (barrels).....	81.6	67.9	32.6	60.7	

Range in Cost of Producing Apples.—The total cost of producing apples per barrel, including the depreciation and interest charges, varies widely from farm to farm and from year to year according, mainly, to the yield secured. Crop failures due to hail, wind storms, and particularly the disastrous winter season of 1934 explain the abnormally high cost on a few farms for the three years 1932-34. While the average cost of production per barrel was \$1.47 for this period, it ranged from 92 cents to \$3.27 on individual farms.

TABLE 6.—RANGE IN COST OF PRODUCTION PER BARREL ON 30 ORCHARD FARMS IN ROUVILLE COUNTY, QUEBEC, 1932-1934

Range	Number of farms	Barrels produced	Range in cost per barrel	Average cost per barrel	Per cent of crop
\$			\$	\$	%
Under 1.50.....	12	59,293	0.92-1.47	1.17	62.2
1.50-2.00.....	8	22,034	1.52-1.98	1.70	23.1
2.00-2.50.....	5	9,120	2.07-2.41	2.11	9.6
Over 2.50.....	5	4,577	2.57-3.27	2.82	5.1
Average or total.....	30	95,204	0.92-3.27	1.47	100.0

Cost of Marketing Apples.—Several methods are used by apple growers of this district to dispose of their crop. A large number of growers truck their apples to Montreal public markets, where they either retail them to individual buyers or sell them to grocery and fruit stores. In 1932 ten growers sold through this channel 22 per cent of the total crop harvested on the thirty orchards included in this study. In 1933 the quantity of apples sold at public markets by twelve growers amounted to 28 per cent and in 1934 fifteen growers marketed 37 per cent of the total crop in the same way.

While this method of marketing presents several weaknesses, it nevertheless offers to many growers an opportunity to dispose of low-grade apples which would not be used otherwise, and provides work at a time of the year during which there is little to do in the orchard. The proximity of a large consuming centre like Montreal combined with the practice followed by many city people of buying a large part of their fruits and vegetables at public markets explain the popularity of this method of marketing apples. It is claimed, however, that the sale of a large quantity of low-grade apple, spoils the market for the good ones and that, from the consumer's standpoint, it is a poor bargain because of the considerable waste resulting from their use.

The cost of trucking and selling apples at public markets itemized in Table 7 shows that the two major items of cost are the use of the motor truck and labour required for handling and selling. The same containers are often used from year to year and this item amounts to very little. The item "other costs" is made up of bridge tolls, market fees, and board of the operator while away from home.

TABLE 7.—COST OF MARKETING APPLES AT PUBLIC MARKETS

Item of cost per barrel	1932	1933	1934	3-year average
	cents	cents	cents	cents
Labour for grading, packing, hauling to market and selling....	0.22	0.25	0.32	0.26
Containers.....	0.05	0.08	0.02	0.05
Truck expenses.....	0.27	0.26	0.26	0.27
Other costs.....	0.08	0.09	0.12	0.09
Total marketing costs.....	0.62	0.68	0.72	0.67

The average price per barrel of apples sold at public markets was \$2.65 in 1932, \$2.35 in 1933, \$3.25 in 1934, and \$2.69 for the three-year period.

The largest part of the crop of this district is sold to truckers and wholesalers at the farm. Apples sold to truckers are roughly graded in open packages and containers exchanged or returned to growers. Apples sold to wholesalers are graded and packed in closed barrels usually supplied by buyers.

The cost of grading, packing and handling apples sold at the farm to truckers or wholesalers averaged 23 cents per barrel for the three years 1932-34. The average price per barrel received by growers was \$1.84 in 1932, \$1.92 in 1933, \$2.79 in 1934, and \$2 for the three-year period.

A few growers dispose of a part of their crop at roadside stands. In Abbotsford, where a co-operative packing plant was organized a few years ago, a large portion of the crop harvested by the growers included in this study was marketed through that plant for the year 1932 but practically none in 1933 and 1934. The cost of marketing apples given in Table 8 represents the average cost to dispose of the total crop of these growers through various methods.

TABLE 8.—COST OF MARKETING APPLES PER BARREL ON 30 ORCHARD FARMS IN ROUVILLE COUNTY, QUEBEC, 1932-1934

Item of cost per barrel	1932	1933	1934	3-year average
	cents	cents	cents	cents
Labour for grading, packing, hauling to market and selling....	0.16	0.17	0.21	0.17
Containers.....	0.21	0.07	0.03	0.13
Other expenses.....	0.22	0.17	0.17	0.19
Total marketing costs.....	0.59	0.41	0.41	0.49

The higher marketing cost per barrel recorded in 1932 is explained by the fact that a portion of the crop was handled through the co-operative packing plant, where the total handling charge amounted to 36 cents per bushel hamper for summer varieties and 60 cents per box for winter varieties. Of course the price received for apples packed in these types of containers was correspondingly higher than the average price for the whole crop marketed in various ways.

It is very difficult to make comparison of the prices received by growers who market their apples through various methods because it is almost impossible to secure accurate data on varieties and grades handled in each case.

Cash Outlay for Operating Bearing Orchard.—While from a general point of view and for the purpose of comparison between various type of farm enterprises it is useful to calculate the cost of production according to some standard method, most farmers are particularly interested to know the cash outlay required for producing and marketing their crop.

They want to know the margin between their cash operating expenses and cash returns for they depend on that to pay for the use of borrowed capital and their living expenses. The cash expenses required for operating a bearing orchard consist of hired labour, purchased feed for horses, spray material, fertilizers, containers, trucking and selling apples, taxes, repairs to buildings and equipment and a few other minor expenses.

The average cash expenses per barrel for producing and marketing apples on these thirty orchards amounted to \$1 in 1932, 88 cents in 1933, and \$1.32 in 1934. The average for the three-year period was \$1.01 per barrel. Since more hired help is required for handling a heavy crop than a small one, up to a certain limit the cash expenses increase with the yield.

Price Received by Growers.—The average price per barrel for all grades of all varieties of apples sold by the thirty growers was \$2.14 in 1932, \$2 in 1933, \$2.94 in 1934, and \$2.23 for the three-year period. The average price per barrel may seem rather low, but it must be pointed out that a good portion of the crop is made up of summer varieties, which usually command a lower price and a fairly large percentage of the winter varieties is of low grade. The wholesale price to the growers for No. 1 McIntosh apples varied from \$3.25 to \$3.50

per barrel in 1932, from \$3 to \$3.25 in 1933, and from \$4.75 to \$5.50 in 1934. As shown in Appendix II, the average price received by individual growers during this period ranged from \$1.60 to \$4.14 per barrel. This wide spread is due to several factors, namely, variety and grade of apples, method of packing and marketing, and so forth. It is obvious that the grower who retails the bulk of his crop to a special clientele willing to pay a premium for a good grade of apples will receive a higher price than those who sell their crop to truckers and peddlers without paying much attention to the quality or the appearance of their product.

Profit per Barrel.—The net profit per barrel is affected by many factors; some of them are under the control of the grower, some are not, particularly climatic factors. Generally, apple growers who produce at a low cost a heavy crop of good quality and sell it at a high price with the minimum expenses will realize the highest net profit per barrel, but on occasions this good work is lost due to conditions beyond their control. A good illustration of this point is given in this study, for some of the most efficient growers had their crop either ruined or greatly damaged by hail or wind storms for one or two years out of three, and consequently made a substantial loss per barrel.

The average net profit per barrel realized for the three years 1932-34 was 27 cents and seventeen growers out of thirty made a profit ranging from 2 cents to \$1.56, while thirteen growers experienced a loss ranging from 8 cents to \$1.66 per barrel.

Man Labour Requirements on Apple Crop.—The amount of man labour required to perform various operations in the orchards prior to harvest does not vary much from year to year unless something unusual happens to the orchard, as in 1934. The man labour requirements per acre for pruning trees, brush hauling, fertilizing, spraying, mowing, mulching and propping averaged 65 hours in 1932, 67 hours in 1933, and 58 hours in 1934. Man labour requirements for harvesting are closely related to the size of crop. In 1932 it required 69 man hours for picking and hauling an average yield of 81.6 barrels to the acre, 63.6 hours in 1933 with an average yield of 67.9 barrels, and 30.8 hours in 1934 with an average yield of 32.6 barrels. The total man labour requirements for growing and harvesting apples amounted to 118 hours per acre for the three years 1932-34 with an average yield of 60.7 barrels. The rate per man per day for picking is from ten to twelve barrels, and for grading by hand and packing from twelve to fifteen barrels.

CONCLUSIONS

The apple industry in Quebec experienced a severe set back during the years covered by this survey and since. During the first part of this period, that is from 1930 to 1934, prices of apples, as of most farm products, fell to a low level, and as a result of the disastrous winter of 1933-1934 the heavy loss of apple trees has reduced the potential crop much below normal. In addition to that, the late frost which occurred on May 16, 1936, at the blooming stage, destroyed a large portion of that year's crop, which amounted to 91,000 barrels, that is, only 44.6 per cent of the five-year average 1930-1934. Combining both the effects of the economic depression and adverse climatic factors it seems that apple growers of this district and of Quebec in general are experiencing one of the worst periods in the history of the apple industry, for it will take many years before these orchards are restored to their normal production. The situation is particularly bad for small growers who derive their sole income from the orchard. It is obvious that growers who are left with less than 300 bearing trees yielding on the average a barrel per tree will find it difficult to make a sufficient cash income to carry through during the next few years and up to the time young orchards are bearing enough to take the place of the trees which were lost since 1934.

What makes the situation still more difficult is that most factors which brought about this situation are beyond the farmer's control. The best orchards have been affected to the same extent as the poorest ones. The only advantage the most successful growers have over the least efficient ones is that they will get better returns from the trees spared by winter killing. This suggests that the way out of this difficult situation does not lie only in better orchard management but, in a large measure, in the reorganization of the whole farm business whenever possible in order to develop other sources of income, small fruits, vegetables, poultry and such like. Quicker returns may be secured from these various enterprises without much capital outlay and this would provide work for the help available on the farm and at the same time it would reduce the risks involved in this type of farm business. The experience of the past few years is sufficient to make one realize that there are a lot of risks in the orchard industry. Besides frost, hail and wind storms which damage both trees and fruit, there are insect pests and diseases the control of which is not always successful. In the long run it seems safe and wise to recommend a careful study of the possibilities afforded to each individual grower along the lines of diversification of the farm enterprises up to a certain point.

While orchard management is not carried out with the same degree of efficiency by all growers, it appears, however, that most of them put in practice modern methods of orcharding. More consideration has been given to pruning, fertilizing, spraying in recent years and the average yield of the leading varieties in commercial orchards is satisfactory. Of course, there is still much that can be done to improve production practices and the present is the proper time to put these into practice in order to get the largest returns from apple trees left intact.

For the next few years many growers will have less work to do during the harvesting season and they could devote more of their time to improving their marketing methods. Very few growers of this district sell their best apples in packed boxes. The barrel has been the type of container mostly used by those who dispose of their crop through wholesalers. It might be worth while to investigate other methods of marketing the apple crop in this district, in order to ascertain whether a more profitable one could be adopted.

APPENDIX I

AVERAGE FINANCIAL RETURNS OF ORCHARD FARMS, ROUVILLE COUNTY, QUEBEC, FOR SIX YEARS, 1929-1934

(Sorted on the basis of cash income)

Farm No.	Size of farm acres	Bearing orchard acres	Non-bearing orchard acres	Other crops acres	Pasture, wood and waste land acres	Farm capital \$	Apple receipts \$	Other cash receipts \$	Invent-ory increase \$	Total receipts \$	Cash expenses \$	Unpaid labour \$	Invent-ory decrease \$	Total expenses \$	Farm income \$	Labour income \$	Cash income \$
1.....	86.2	42.2	8.4	12.6	23.0	26,923	8,671	217	78	8,966	3,882	.....	364	4,246	4,720	3,374	5,006
2.....	81.1	16.9	16.9	4.2	43.1	29,833	3,990	746	66	4,802	1,957	117	427	2,501	2,301	809	2,779
3.....	49.8	12.6	4.2	1.7	31.3	13,211	4,230	339	199	4,759	1,980	377	321	2,678	2,081	1,421	2,589
4.....	121.7	33.8	11.0	29.6	47.3	33,167	4,333	630	98	5,061	2,502	158	696	3,356	1,705	2,461	2,461
5.....	177.4	10.1	7.6	101.4	58.3	27,333	2,368	1,041	41	3,450	1,091	993	522	2,606	844	-519	2,318
6.....	38.0	18.6	6.8	2.5	10.1	16,700	3,013	249	14	3,276	1,006	418	206	1,630	1,646	577	2,256
7.....	42.2	16.9	16.9	.....	8.4	16,766	5,187	32	94	3,313	3,103	60	328	3,491	1,822	984	2,116
8.....	121.7	39.7	43.1	24.5	14.4	34,154	2,834	203	58	3,095	1,043	657	550	2,250	845	-863	1,994
9.....	46.5	16.9	4.2	3.4	22.0	16,419	2,859	652	14	3,025	1,202	414	285	1,901	1,124	303	1,809
10.....	169.0	13.5	11.0	34.6	109.9	28,142	2,757	809	54	3,630	1,202	252	491	2,599	1,031	-376	1,720
11.....	230.6	42.2	25.4	16.9	146.1	33,356	5,734	1,014	206	6,954	5,116	.....	522	5,638	1,316	-352	1,632
12.....	33.8	21.1	1.7	.....	11.0	24,780	3,479	1,014	82	3,581	1,902	20	192	2,114	1,467	228	1,597
13.....	31.3	27.8	.....	.....	3.5	21,706	3,788	76	127	3,991	2,282	.....	270	2,552	1,439	353	1,582
14.....	112.4	5.9	3.4	36.3	66.8	14,550	1,124	636	39	1,799	547	26	273	846	953	211	1,213
15.....	76.0	16.9	16.9	4.2	38.0	16,341	2,312	391	72	2,775	1,505	62	389	1,956	819	1	1,198
16.....	10.1	6.8	3.3	.....	.....	13,638	1,920	40	86	2,046	809	504	220	1,533	513	169	1,151
17.....	15.2	8.4	3.4	0.8	2.6	6,584	1,462	21	77	1,560	365	508	176	1,049	510	181	1,118
18.....	93.0	25.4	.....	20.3	47.3	21,192	2,079	189	74	2,342	1,312	128	174	1,614	729	331	956
19.....	50.7	9.3	16.0	1.7	23.7	11,377	1,726	272	25	2,023	1,135	.....	250	1,385	638	69	863
20.....	10.1	7.6	1.7	.....	0.8	10,584	1,112	30	7	1,149	361	213	211	785	364	165	781
21.....	16.0	4.2	2.5	.....	9.3	6,447	945	160	9	1,114	440	318	190	948	166	-156	665
22.....	14.4	10.1	.....	.....	4.3	9,588	1,213	193	42	1,448	1,774	367	293	1,434	14	-466	632
23.....	27.8	7.6	3.4	.....	16.8	11,480	1,886	86	101	2,073	1,427	65	213	1,705	368	-206	545
24.....	18.6	5.1	3.4	.....	10.1	9,091	809	452	17	1,978	546	182	187	915	63	-391	415
25.....	94.6	11.0	9.3	9.3	65.0	10,342	801	197	16	1,014	2,825	10	305	964	561	-466	348
26.....	127.6	12.6	9.3	44.8	60.9	30,423	2,291	692	168	3,150	2,411	.....	587	3,412	-261	1,782	158
27*	25.4	16.9	6.8	.....	1.7	21,718	4,331	144	94	4,569	2,411	.....	236	2,647	1,922	836	2,004
28.....	84.5	21.1	.....	.....	63.4	23,526	2,452	121	.....	2,573	1,033	243	562	1,838	735	441	1,540
29.....	55.8	12.6	4.2	4.2	34.8	16,107	2,100	428	80	2,608	1,070	.....	365	1,435	1,173	368	1,458
30.....	7.6	5.1	0.8	.....	1.7	7,415	.....	.....	.....	984	394	.....	125	519	465	94	590
31.....	120.8	16.0	7.6	47.3	49.9	21,268	2,578	913	129	3,620	1,145	1,307	430	2,882	738	9	2,346
32.....	50.7	25.4	5.1	5.1	15.1	18,587	3,003	414	74	3,491	2,013	.....	375	2,388	1,103	174	1,404
33.....	40.5	8.4	.....	6.8	25.3	9,012	1,439	390	49	1,878	637	248	176	1,061	817	366	1,192
34.....	60.8	7.6	4.2	23.6	25.4	10,634	1,289	457	64	1,810	572	653	215	1,440	370	5	1,174
Average.....	70.6	16.7	8.0	14.0	31.9	18,591	2,718	350	70	3,138	1,540	235	330	2,106	1,032	102	1,528

N.B.—The acreage of these farms was first recorded in arpents, and subsequently converted into acres. An arpent is equal to 0.845 of an acre. This explains the odd figures used in the three first columns of this table.
Data for farms 27 to 30 represent the three year average 1932-1934 and data for farms 31 to 34 represent the three-year average 1929-1931.

APPENDIX II

AVERAGE COST OF PRODUCING AND MARKETING APPLES ON 30 ORCHARD FARMS, ROUVILLE COUNTY, QUEBEC, FOR THREE YEARS, 1932-1934

(Sorted on the basis of Profit or Loss per barrel)

Farm number(1)	Per farm				Per acre			Per barrel						
	Acreage in bearing trees	Bearing trees	Operating cost(2)	Gross returns	Operating profit	Yield (barrels)	Investment	Total Cost of production	Cost of production		Total Cost of production and marketing	Price received by growers	Profit or loss	
									Exclusive of depreciation and interest	Inclusive of depreciation and interest				
acres	No.	\$	\$	\$	No.	\$	\$	\$	\$	\$	\$	\$	\$	
3	15.5	1,675	2,002	4,226	2,234	80.6	731.31	127.13	1.05	1.57	0.55	2.12	3.68	1.56
30	5.1	225	440	984	554	46.8	976.38	126.58	1.42	2.70	0.43	3.13	4.14	1.01
19	12.7	842	651	1,567	916	52.0	467.50	74.08	0.89	1.42	0.10	1.52	2.38	0.86
5	11.3	1,033	1,027	2,087	1,060	68.0	621.33	91.54	0.81	1.35	0.53	1.88	2.72	0.84
29	12.7	767	1,095	2,100	1,005	57.2	537.26	82.76	0.90	1.45	0.61	2.06	2.90	0.84
27	16.9	1,435	2,148	4,331	2,183	102.7	918.80	139.62	0.85	1.36	0.38	1.74	2.50	0.76
2	16.9	1,175	1,363	3,052	1,689	90.9	657.89	99.72	0.68	1.10	0.21	1.31	1.99	0.68
1	50.7	3,533	3,234	7,271	4,037	85.6	397.07	79.34	0.66	0.93	0.08	1.01	1.67	0.66
1	21.1	1,117	1,123	2,452	1,329	47.8	673.85	81.20	0.91	1.69	0.20	1.89	2.42	0.53
12	16.9	1,050	1,781	3,241	1,460	48.8	877.33	90.96	0.88	1.86	0.84	2.70	3.14	0.44
7	16.9	1,133	3,478	4,744	1,266	119.2	498.91	109.90	0.66	0.92	1.06	1.98	2.35	0.37
11	42.2	1,885	3,943	5,902	1,959	62.5	469.81	66.17	0.60	1.06	0.89	1.95	2.23	0.28
17	8.4	505	907	1,330	423	63.4	488.81	112.84	1.23	1.78	0.46	2.24	2.47	0.23
14	5.3	333	582	963	381	74.8	902.19	122.75	0.91	1.64	0.53	2.19	2.41	0.22
6	19.7	1,733	1,731	2,748	1,017	63.2	710.32	92.89	0.86	1.47	0.53	2.00	2.21	0.21
8	42.2	2,887	1,411	2,479	1,088	36.6	400.39	49.88	0.74	1.36	0.18	1.54	1.60	0.06
4	33.8	1,360	2,184	3,267	1,083	47.3	542.55	64.94	0.72	1.37	0.65	2.02	2.04	0.02
13	27.9	1,303	1,642	2,508	866	40.6	624.29	84.21	1.22	2.07	0.23	2.30	2.22	0.08
13	12.7	967	1,441	1,880	439	73.7	766.18	122.50	1.00	1.66	0.54	2.20	2.01	0.19
26	16.9	850	1,801	2,016	215	56.3	421.10	77.97	0.93	1.38	0.96	2.34	2.12	0.22
15	7.6	732	1,317	1,538	221	77.0	776.09	165.69	1.49	2.15	0.76	2.91	2.63	0.28
23	18.6	2,067	1,977	2,307	330	70.4	714.50	107.14	0.96	1.52	0.56	2.08	1.77	0.31
10	4.2	262	490	617	127	61.9	719.13	159.21	1.73	2.57	0.15	2.72	2.37	0.35
9	16.9	843	1,160	1,492	332	35.4	554.91	78.72	1.30	2.22	0.64	2.86	2.49	0.37
22	10.1	633	1,144	1,277	133	41.8	538.68	96.88	1.53	2.32	1.17	3.49	3.02	0.47
25	11.0	517	453	580	127	27.2	419.70	65.85	1.39	2.41	0.12	2.53	1.93	0.60
16	6.7	550	863	1,022	159	64.7	1,070.78	176.40	1.72	2.73	0.25	2.98	2.33	0.65
20	7.6	633	737	861	124	44.4	746.71	119.17	1.62	2.68	0.25	3.25	2.55	0.70
18	25.3	1,548	1,302	1,478	176	34.7	593.21	68.42	1.04	1.98	0.44	2.42	1.68	0.74
24	5.1	480	557	430	127	49.8	883.22	162.89	2.11	3.27	0.09	3.36	1.70	1.66
Average	17.4	1,128	1,466	2,358	892	60.7	592.87	89.00	0.90	1.47	0.49	1.96	2.23	0.27

1 Farm numbers in this table correspond with farm numbers used in Appendix I.

2 Operating cost per orchard represents all cost exclusive of depreciation and interest on investment in land, trees, fruit house and orchard, equipment.

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