National Maple Syrup
• DIGEST •

CENTRAL EVAPORATOR PLANTS

Vol. 2, No. 3 BAINBRIDGE, NEW YORK DECEMBER 1963

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Lloyd Sipple
Bainbridge, N.Y.

COVER PICTURE

On the cover of this issue we have a picture of a covered bridge, located near Waterville, Vermont, and used every day. The covered bridge, once popular, is fast becoming a rarity. They served their purpose but are giving way to steel and concrete. Maybe we ought to take a good, long look at this picture and do a little thinking.

Is the Maple Industry tied to the horse and buggy days? Are we making Maple Syrup the same way, with the same kind of equipment our grandfathers did fifty or a hundred years ago? Maybe we oughta reorganize.

Photo by Bob Lamb

DIGEST ADVERTISING RATES

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ADVERTISING DEADLINE

for

JANUARY ISSUE

DECEMBER 1st

for

FEBRUARY ISSUE

JANUARY 1st

Letter to the Editor

Dear Editor:

The other day my neighbor told me the government paid him $1,000.00 to not raise any corn. I wonder if you could tell me if they would pay me to not make any Maple Syrup.

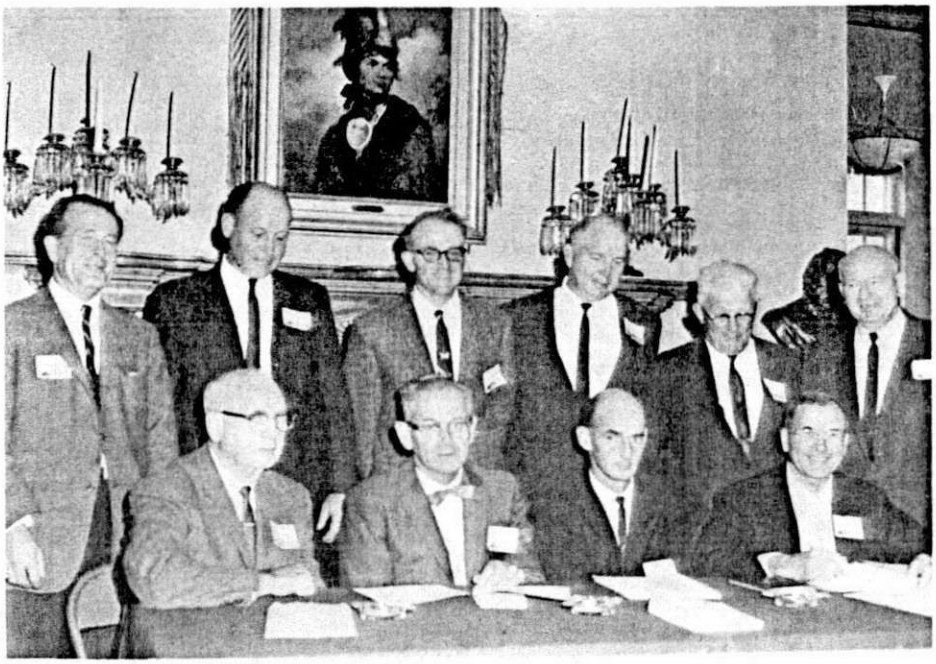
I am too old and crippled to do any work and since I don't have a sugar bush anyway, getting paid to not make syrup would be right up my alley. I have never made any syrup so I don't know anything about it, but I don't think it would be too hard to learn enough to not make any.

I would also like to know if they pay more to not make fancy syrup than they do to not make the dark, commercial grades. I would rather not make fancy because I don't like the dark kind, but I figure I might better not make the kind that they pay the most for.

Yours truly,
A. Ole Mann

P.S.

A few years ago the government paid me to clear the trees off from a piece of my land. Would they also pay me to plant maple trees on this land for the purpose of not making syrup (for pay) when they get big enough to not tap?



The above picture, courtesy of the Oneonta Star, Oneonta, New York, and taken in the Fenimore House, Cooperstown, New York, shows the officers and delegates of the Council. They are, front row, left to right: Dr. C.O. Willits, Philadelphia, Pa.; Linwood Lesure, Ashfield, Mass.; Lloyd Sipple, Bainbridge, N.Y.; Putnam Robbins, East Lansing, Mich. Second row: Ted Harding, Athens, Me.; Eric Nye, Milton, Vt.; Kenneth Bascom, Alstead, N.H.; Ture Johnson, Burton, Ohio; George Keim, W. Salisbury, Pa.; Adin Reynolds, Aniwa, Wisc.

LIN LESURE – New Council President

Linwood Lesure

New York State played host this year to the Fourth Annual meeting of the National Maple Syrup Council on October 10 and 11. At the meeting held in the Fenimore House, Cooperstown, N.Y., Linwood Lesure of Ashfield, Massachusetts was elected president of the Council for 1964.

Mr. Lesure is the Secretary-Treasurer of the Berkshire-Pioneer Maple Producers Association of Massachusetts, a position he has held for several years. This Association markets a considerable amount of Maple Syrup each year under the Association name. Much of the credit for the success of this merchandising venture must go to Lin. He also manages the sales booth for his association at the Eastern States Exposition. This has also proved very successful.

Lin is probably not as well known throughout the Maple producing belt as some of the other directors of the Council, but he has the enthusiasm and aggression to do a first class job as leader of the Council. I'm sure everyone wishes him success in his new position.

At the same meeting, Adin Reynolds, Aniwa, Wisconsin, was elected Vice President for the coming year. Adin, head of Reynolds Sugar Bush, the largest maple syrup producing plant in the world, has done much for the maple industry in Wisconsin as well as several neighboring states. The Council is fortunate in having Adin as one of its officers.

Prof. P.W. Robbins of Michigan State University was re-elected for a second term as Secretary-Treasurer. Prof. Robbins is well known in the maple world for his work with Dr. Costelo in developing the paraformaldahyde tap hole pellet. He has been active for many years in maple research projects as well as other phases of the industry. The Council appreciates his willingness to serve again.

Insufficient time prevents including a report on proceedings of the annual meeting. We expect to have this report ready for the next issue.

Lloyd H. Sipple
Past President

Drops in the Bucket

The 1963 season was one to remember in the Northeast. Snow that fell in December was on the ground at tapping time. What is worse, there was no January thaw and no February thaw, either. Thus, the snow in the Northeast was as fluffy in March as it was in December. Work of breaking trails and tapping was more than strenuous. Not all memories were happy ones.

* * *

To top off the deep snows, ***heat*** in large quantities melted the five foot cover of snow in a matter of days. The parched and unfrozen ground took the water easily and runoff was at a minimum. Sap sweetness for the season was good in most areas. Was this due to the summer drought? The long, cold winter? The lack of frost in the ground?

* * *

Warmth really emphasized the value of pellets. Many producers who used pellets only in part of the bush found that the untreated areas were dried up or cloudy in only a few days, while the treated taps continued to run even though quality was not of the best. In fact, the the pellets lead to a problem foreseen and forecast by Dr. Willits, Dr. Underwood and Dr. Wasserman; that "buddiness" would show up more as pellets became more commonly used. For once a great many people learned what buddy syrup was.

* * *

Peculiar things happened in this unusual season. Trees that should have never been running ***ran.*** In Southwestern Chautauqua County, New York, trees were running (not just dripping!) fast at temperatures of 75-80° three or four days after the last freezing temperatures. This sap, of course, was buddy. The area produced only 20% of a crop for the year in an area which generally produces one of the largest crops in the state.

* * *

Publicity for maple has grown over the years. Many areas have developed maple festivals and pancake days and many similar ideas to acquaint people with the products. Adin Reynolds of Wisconsin, Vice-President of the National Maple Council, has developed one which approaches the Paul Bunyan tech-

(continued on page 14)

RESEARCH RESEARCH RESEARCH

As a maple producer you have experienced vast technological changes in the past few years. Mechanical drilling devices have made tapping easier. In the collection of sap, wooden buckets have given way to metal ones and they in turn are giving way to plastic bags and tubing. Large metal kettles gave way to specialized evaporation and finishing pans and we are now witnessing the adoption of the central evaporator, where the sap of many producers is handled in one plant. The last five years have even seen maple producers playing "doctor" in their sugar bush – rumor has it that come spring they administer pills to the trees through tap holes. Regardless of where we look, technological revolution has entered the maple industry.

To many it is a thing of sadness to see the old pass away, but in our world change is as inevitable as the passing of the seasons. It is often asked, "How does change come about?" Change comes about when a farmer asks himself, "Wouldn't it be easier if I didn't have to spend all that time and money cutting wood in the winter and firing the evaporators in the spring." Generally a farmer makes changes himself, but sometimes he finds the job is too big and he requires help. When he needs help, he generally goes to another farmer, equipment dealer or manufacturer, county agent, or other persons or agencies with more resources at their disposal. If the idea is new and these people do not have the answer, the problem is referred to a research group. The problem with wood cutting and burning was referred to Dr. C.O. Willits and his staff at the U.S. Department of Agriculture's lab in Philadelphia, which resulted in oil-fired evaporators. The problem of collecting and transporting sap was solved by equipment dealers and manufacturers with plastic bags and tubing. The problem of tap hole "drying" was referred to the Michigan State University, and this research encouraged maple producers to turn doctor. The central evaporator problem was referred to the Pennsylvania State

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Economics of the Central Evaporator in Producing Maple Syrup

Jerome K. Pasto and Reed D. Taylor
Professor and Instructor in Agricultural Economics
The Pennsylvania State University

NOTE: The following article is condensed from Bulletin 697, August 1962, of the Pennsylvania State University's Agricultural Experiment Station, titled **ECONOMICS OF THE CENTRAL EVAPORATOR IN MAPLE SYRUP PRODUCTION.** Many of the facts, figures and tables of the above bulletin are omitted due to space limitations. Figures for the smaller plant, 8,800 gallons of syrup per season, are included while most of those for larger plants are omitted. If you are planning to build a central evaporator plant, this bulletin can be obtained by writing:

Agriculture Mailing Room
College of Agriculture
The Pennsylvania State University
University Park, Pennsylvania

The authors are indebted to Lloyd Sipple for help in editing this article and to Dr. C.O. Willits and Bob Lamb for pictures of Central Evaporator operations.

DIGEST

Information gathered from the few makers of maple products who now purchase sap to supplement their own supplies, from the industry as a whole, and from manufacturers of up-to-date equipment, indicates that the local evaporating plants serving considerable numbers of farmers would be an economical means of processing sap into syrup. Budgets were calculated for plants of three sizes, to accommodate varying conditions. All operating expenses, depreciation, and interest on capital invested were included in the costs of processing.

Plant A, the smallest, requiring an investment of about $25,000, would produce about 8,800 gallons of syrup per season. At this plant, the total cost of evaporating sap of 2.4 degrees Brix would be $1.69 per gallon of syrup. With syrup valued at $5 per gallon, 9.2 cents per gallon of sap would be available to cover the cost of purchasing the sap, to provide for contingencies, and if desired, to pay a rate of interest on the capital higher than the 6 per cent included in the budgets.

Plant B, requiring an investment of $32,000 would produce 13,200 gallons of syrup per season. Cost of operation based on 2.4 degrees Brix sap would be $1.54 per gallon of syrup, leaving, for $5 syrup, 9.6 cents per gallon of sap to cover the cost of the sap, contingencies and any return higher than 6 per cent on the capital.

Equivalent figures for Plant C, the largest, would be a $39,000 investment, 17,600 gallons of syrup per season, operating costs of $1.47 per gallon of syrup, and 9.8 cents per gallon of sap.

Processing costs per gallon of syrup fall sharply as degrees Brix of the sap increase. For plant size B, for example, the cost of processing falls from $2.11 per gallon of syrup made from sap of 1.6 degrees Brix, to $1.26 per gallon of syrup made from sap of 3.2 Brix. With syrup valued at $5 per gallon, this means an increase from 5.4 cents to 13.9 cents in the balance left per gallon of sap.

Introduction

One of the key elements in maple production is the evaporation and finishing process. Reasonable skill is required to produce high grade syrup even from sap of satisfactory quality. But more importantly, evaporation and finishing require considerable investment in plant and equipment if the job is to be done well and with minimum labor requirements. Many producers of maple products cannot afford proper equipment because of the small size of their operations.

This situation has led to consideration of a central evaporator to which producers would deliver their sap for evaporation. A central evaporator could handle a large volume of sap and thus reduce per unit costs of processing. Quality could be controlled because of adequate equipment and skilled management. Further, a large enough quantity of the finished product would be available to interest big buyers, and marketing efficiency could be improved because of the larger volume handled.

The purpose of this study was to examine the economics of construction and operation of a central plant for evaporating maple sap into syrup.

Method of Study

No central evaporators, of the type visualized herein, exist in Pennsylvania. Several large producers in this and nearby states purchase limited quantities of sap from neighbors to supplement their own supplies. While in some respects these operations approach the type planned, most of the sap is home produced, and their size is less than what it is felt a central evaporator would need to be in order to serve many farmers.

Cost data and other operational information were obtained through visits to four large maple producers, by correspondence with manufacturers of maple equipment and boilers, and by consultation with professional persons engaged in maple work. These data were used as a basis for calculating budgets for capital investments and operating costs.

For the purpose of this study, the assumption was made that evaporation and processing begins after the producer has delivered his sap to the receiving tanks at the plant. It ends when the finished syrup has been placed in cans. The method of analysis used was to first determine the cost of processing the sap, on a per gallon of syrup basis. This cost was subtracted from the price of syrup per gallon. The remainder was left to pay for the sap, to establish a contingency fund, and, if desired, to return more than the budgeted 6 per cent on the capital invested.

Plant size.—Three different sizes of plant were budgeted, A, B, and C,

increasing uniformly in size from A to C. The main reason for budgeting three plants was to allow flexibility in choice of size to suit local situations. Another was to examine the effect of plant size on the cost of evaporating and processing maple sap into syrup.

The smallest plant budgeted in this study approximates the size of the largest individual operations visited. Actual cost data and other information obtained on the latter served as a guide in setting up the budgets.

Ownership and Management—Complete budgets were calculated for each size of plant under the assumption that these plants would be built and operated as private enterprises. However, the plants could be financed and operated cooperatively.

For purposes of analysis, the assumption was made that management does not contribute physical labor in the plant, although management was included as a cost. However, if an owner-manager supervised the operation of his plant and provided some labor as well, he could claim for himself the money budgeted for these items in addition to the pay received as manager.

Assumptions and Operating Procedures

Fuel.—On most farms engaged in maple production, the traditional source of heat for evaporation is wood from trees culled from the groves that produce the sap. This practice suits the farmer who has periods during the year when labor is available to prepare firewood for the evaporator house.

In a commercial operation such as planned herein, however, wood would have to be purchased, and sufficient labor to fire the sap evaporators and boiler would have to be hired. The uneven heat provided would reduce the quality of syrup produced and lower efficiency of the plant. Financial budgeting soon showed that wood could not seriously be considered as a source of energy.

In this report oil was chosen as the energy source because it may be obtained in most localities. Also, oil heat can be controlled almost automatically, thus reducing labor costs. Sap evaporators with direct heat appear in the budgets except for the semi-finishing and finishing evaporators where heat with steam pipes is provided.

Management time and its cost.—A manager would spend 2.5 months full-time equivalent on plant business. While the actual processing season would last only five weeks, he would need to spend some time before and afterward in seeing that the plant is properly opened and closed. In addition he would have to tend to some details outside the regular season for which he should be paid. As budgeted, managers would be paid at the rate of $640, $800, and $960 per month equivalent or $1,600, $2,000, and $2,400 for the season for the 3 sizes of plants, A, B, and C, respectively.

Grade and price of syrup.—Up to 80 per cent of the total output of a well-operated plant should be top table grade syrup, provided, of course, that the sap available is of good quality. In the analysis charts and tables, syrup is priced at 3,4,5, 6 and 7 dollars per gallon. Any of these prices can be used, or others can be interpolated. These prices are for syrup in gallon cans, at the plant, before marketing;—i.e., the value of the syrup to the processor at this point would be equal to a reasonable wholesale price. The difference between this price and the processor's "retail" price should be a return to marketing and not to processing.

Syrup losses.—Some syrup is sure to be lost before collection in retail containers. These losses were budgeted at 2 per cent of total syrup production.

Evaporation rate of water per gallon of oil.—The basic capacity of any plant is determined by the quantity of water which can be evaporated in it in a given period. This in turn depends upon the quantity of oil consumed, and the efficiency with which the oil is utilized. For this study, each gallon of oil was assumed to evaporate 12 gallons of water. A higher figure was reported by some operators in this study, but the more conservative rate was used.

Level of technology.—Sap and syrup, being liquids, lend themselves to almost complete plant automation, Fig. 1. Pipes, pumps, floats, and other automatic devices can be installed to regulate the whole process of evaporation and finishing. The plants were budgeted with modern, but proven equipment.

Plant Size

The size of a central evaporator can be measured in several ways. Each measure is useful, depending upon the purpose of the analysis. Size factors considered important are summarized in Table 1. Capital investments for plants A, B, and C were estimated at $25,000, $32,000, and $39,000, respectively, and syrup production during an average season at 8,800, 13,200, and 17,600 gallons. Other size factors are included in the table.

(continued on page 8)

Figure 1

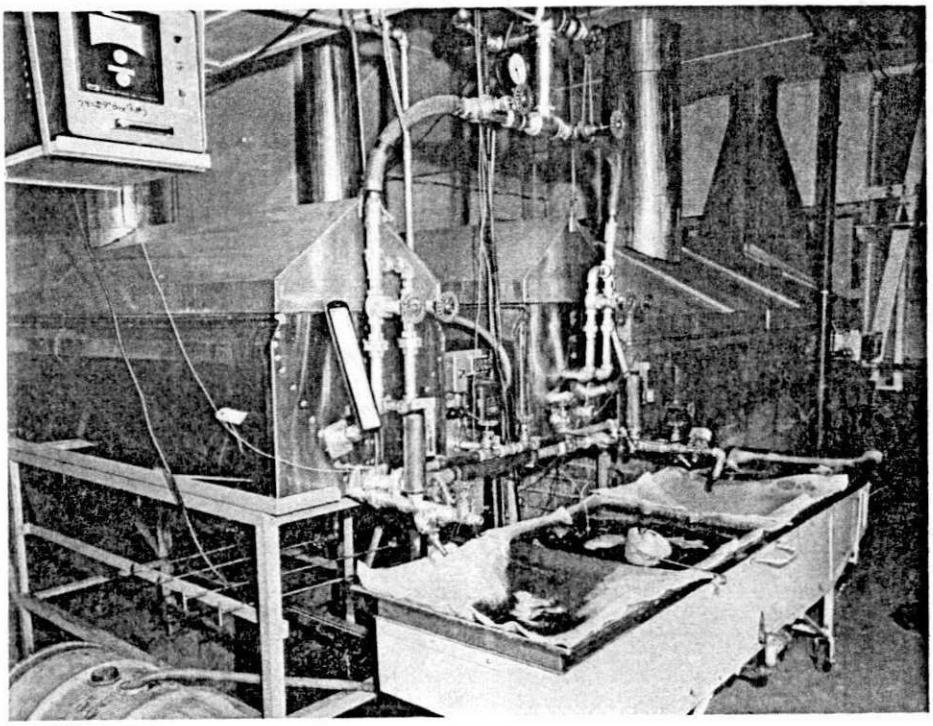

Table 1.—Size factors for maple sap evaporating plants of three sizes A, B, and C.

Item	Unit of measure	Plant size A	Plant size B	Plant size C
Capital investment				
Land	Dollars	200	200	200
Grading, roadways	Dollars	500	500	500
Building	Dollars	4,904	6,392	7,960
Equipment	Dollars	19,687	24,778	30,009
Total	Dollars	25,291	31,870	38,669
Syrup produced*				
Per hour	Gallons	22.2	33.3	44.4
Per season	Gallons	8,792	13,188	17,583
Space requirement	Square feet	1,226	1,598	1,990
Sap evaporators†	Number	4	6	8
Oil burners	Number	4	6	8
Boiler size	Horse power	20	30	40
Fuel oil consumption				
Burners				
Each per hour	Gallons	15	15	15
All per hour	Gallons	60	90	120
All per season	Gallons	23,760	35,640	47,520
Boiler				
Per hour	Gallons	6	9	12
Per season	Gallons	2,376	3,564	4,752
Total all oil per season	Gallons	26,136	39,204	52,272

*Assuming sap of 2.4 degrees Brix.
†One semi-finishing steam evaporator, and two finishing steam evaporators are in addition to these.

Capacity Factors

Yield of syrup per gallon of sap increases sharply as the sugar content of the sap increases. The sap handling capacity of the plant also increases.

Since costs of producing syrup and plant capacity factors depend so much upon degrees Brix of the sap, data in Table 2 are presented for three Brix levels.

Table 2—Plant Size A: Capacity factors in relation to degrees Brix of maple sap.

Row	Factor	Degrees Brix 1.6	Degrees Brix 2.4	Degrees Brix 3.2
1	Sap-syrup ratio			
	Gallons of sap per gallon of syrup	53.94	35.96	26.97
2	Water evaporation-syrup ratio			
	Gallons, water evaporated per gallon of syrup	52.94	34.96	25.97
3	Plant evaporation capacity			
	Gallons water per hour	792	792	792
	Gallons water per season	313,632	313,632	313,632
4	Syrup produced			
	Gallons per hour	14.66	22.20	29.89
	Gallons per season	5,806	8,792	11,835
5	Sap handling capacity of plant			
	Gallons per hour	807	815	822
	Gallons per season	319,556	322,603	325,709
6	Tap holes accommodated	31,956	32,260	32,571

Physical Plant and Equipment

Details of investment for plant, size A are given in Table 3. The figures can be used as a guide throughout Pennsylvania, and with minor adjustments, in other maple producing areas of the United States. In order that transportation costs for some equipment items could be properly estimated and included, however, Somerset County, Pa. was chosen as the site location. The table also includes some details on depreciation and repairs which are discussed later under operating costs. Explanatory notes on investment items in Table 3 follows:

Land.—One acre of land will suffice for a plant of any of the three sizes. The site should be adjacent to a paved road and have electricity available. Location with respect to potential sap producers is an important consideration, but the land need not be suitable for farming. Interest on money invested in land is included in each operating budget, but no depreciation or repair cost on the land is entered.

Roadway, ramps, grading.—Gravelled driveways are necessary to accommodate vehicles delivering sap. In some cases ramps may be desirable from which vehicles can be emptied by gravity. Some grading around the building may be necessary.

Building.—The floors are of concrete block. The footers are to extend 3 feet below the ground surface to the frost line, as are foundations for the evaporators. The cost of the building includes the main evaporator room, a rest room, a small office, and a storage room for the syrup after it is placed in gallon cans. Cost of floor space is estimated at $4.00 per square foot.

Equipment and other items.—Sap receiving tanks to hold about 19,500 gallons of sap are included. Costs are based on 5,000-gallon, round bottom tanks of 24-gauge galvanized iron. The cost of each tank was quoted by a supplier at $390 plus $25 freight from Vermont, or $.083 per gallon of storage capacity. Three germicidal lamps are included for each tank, to keep down bacterial growth.

A pump is budgeted for each plant to move sap from delivery to receiving tanks, for cleaning equipment, and other miscellaneous uses. The sap filter is of simple construction, to strain out leaves, twigs, and other large particles.

Each sap evaporator is quoted at $525, including $15 for transportation. Their dimensions are 5 - by - 10 feet, and they are made of double coated English tinned steel. Four are budgeted for plant A.

Arches for the sap evaporators are included in the budgets. Covers and stacks for the sap evaporators and for the semi-finishing and finishing evaporators are included as separate items.

The size of the steam semi-finishing evaporator depends upon the plant size. The cost of each, including freight from Vermont, as well as costs of covers and stacks, are included in Table 3.

One float valve is provided for each evaporator, and one for the semi-finishing evaporator.

Two 50-gallon steam finishing evaporators, with coils, are quoted at $100 each. Hoods and stacks for them are included as separate items. Included also are two finishing pressure filters for syrup as well as a gravity filter.

One of the oil burners investigated, within the price range quoted, is of the high pressure type, has a complete electronic control system, and is fitted with a photocell for "no-flame" protection. This unit can be fired to produce heat at various rates if desired. The price of $322 includes freight to Somerset, Pa. from Binghamton, N.Y.

The cost of smokestacks was quoted by a supplier. Each base stack costs $31, and its top stack $57, including freight from Vermont.

The syrup holding tank keeps the syrup at the proper temperature for canning after it leaves the finishing evaporator. If the syrup is not canned immediately but is stored in bulk, this holding tank, since it has steam coils, also can be used to reheat syrup drawn from storage.

Bulk syrup storage is provided for half of the season's expected production. The quantity of storage varies with size of plant, but the cost of tanks is estimated at $.25 per gallon of syrup. Bulk storage helps standardize the product. It also improves labor utilization in filling retail gallon containers since much of this can be done between "runs" of sap when labor is not fully occupied. At least two bulk tanks are recommended in order to provide separate storage for syrup of different grades. Such storage also would be useful if confections and other specialty items are made after the sap season. One producer who obtained used glass-lined bulk tanks from a milk plant found them very satisfactory.

The size of the steam boiler required depends on plant size, as follows:

	Plant A	Plant B	Plant C
Horsepower	20	30	40
Basic price for boiler	$2,500	$2,825	$3,300
Return condensation equipment	350	350	350
Other equipment	100	100	100
Installation	1,500	1,500	1,500
Freight	35	45	55
	$4,485	$4,820	$5,305

Table 3 —Capital investment for maple sap evaporating plant and equipment, and costs for depreciation and repairs, Plant Size A.

Item	Cost	Life length	Yearly depreciation	Yearly repairs
	dollars	years	dollars	dollars
Land				
1 acre @ $200.00	200.00	—	—	—
Roadway, ramps, grading	500.00	20	22.50	15.00
Building				
1,226 sq. ft. @ $4.00/sq. ft.	4,904.00	30	147.12	147.12
Equipment and other items				
Sap receiving tanks				
19,495 gal. @ $.083/gal.	1,618.08	20	72.81	48.54
Germicidal lamps for sap receiving tanks				
12 @ $25.00	300.00	10	27.00	9.00
Pump for sap	150.00	10	13.50	4.50
Sap filter	50.00	10	4.50	1.50
Flue type sap evaporators				
4 @ $525.00	2,100.00	10	189.00	63.00
Arches for sap evaporators				
4 @ $287.00	1,148.00	10	103.32	34.44
Covers and stacks for sap evaporators				
4 @ $160.00	640.00	10	57.60	19.20
Steam semi-finishing evaporator				
Size 5 by 6 feet	138.00	10	12.42	4.14
Cover and stack for semi-finishing evaporator	108.00	10	9.72	3.24
Steam finishing evaporators and coils				
2 @ $100.00	200.00	10	18.00	6.00
Hoods and stacks for finishing evaporators	100.00	10	9.00	3.00
Float valves				
5 @ $5.00	25.00	10	2.25	.75
Oil burners				
4 @ $332.00	1,328.00	10	119.52	39.84
Smokestacks				
4 base stacks @ $31.00				
4 top stacks @ $57.00	352.00	10	31.68	10.56
Finishing filter 2 @ $14.70				
Pressure cartridge	25.40	10	2.29	.76
Finished syrup holding tank with heating device	75.00	10	6.75	2.25
Finished syrup storage tank				
3,940 gal. @ $.25/gal.	985.00	20	44.32	29.55
Steam boiler, 20 hp., installed	4,485.00	20	201.83	134.55
Oil tank, 8,000 gal.	1,000.00	20	45.00	30.00
Automatic syrup draw-off	100.00	10	9.00	3.00
Gravity filter	140.00	10	12.60	4.20
Pumps and motors to filter and to finishing evaporators				
2 units @ $75.00 each	150.00	10	13.50	4.50
Can filling equipment	50.00	10	4.50	1.50
Thermometers				
2 @ $50.00 each	100.00	10	9.00	3.00
Testing equipment				
Refractometer $100.00				
Hydrometer $ 48.00				
Scales $150.00				
Thermometers $ 10.00	308.00	10	27.72	9.24
Portable power stirring device	300.00	10	27.00	9.00
Water supply (well) plumbing, sink	1,000.00	20	45.00	30.00
Rest room furnishings	500.00	30	15.00	15.00
Office equipment	500.00	10	45.00	15.00
Other installation charges (burners, tanks, pumps, etc., becomes cost of equipment)	912.00	10	82.08	27.36
Miscellaneous	800.00	10	72.00	24.00
TOTAL	25,291.48		1,502.53	752.74

In order to take advantage of reduced prices for fuel, approximately 6,000 gallons should be purchased at one time, according to oil dealers. Eight thousand gallons of storage, costing about $1,000, is provided each plant.

An automatic syrup draw-off budgeted at $100, and 2 pumps with electric motors for moving syrup through the filter of each plant and to the finishing evaporators are included.

Can filling equipment at $50, and 2 large thermometers at $50 each are budgeted for each plant. Other testing and equipment valued at $308 is included.

The portable power stirring device, budgeted at $300, is primarily used for mixing syrup in storage tanks into a uniform product.

One thousand dollars is budgeted for the well and equipment for the

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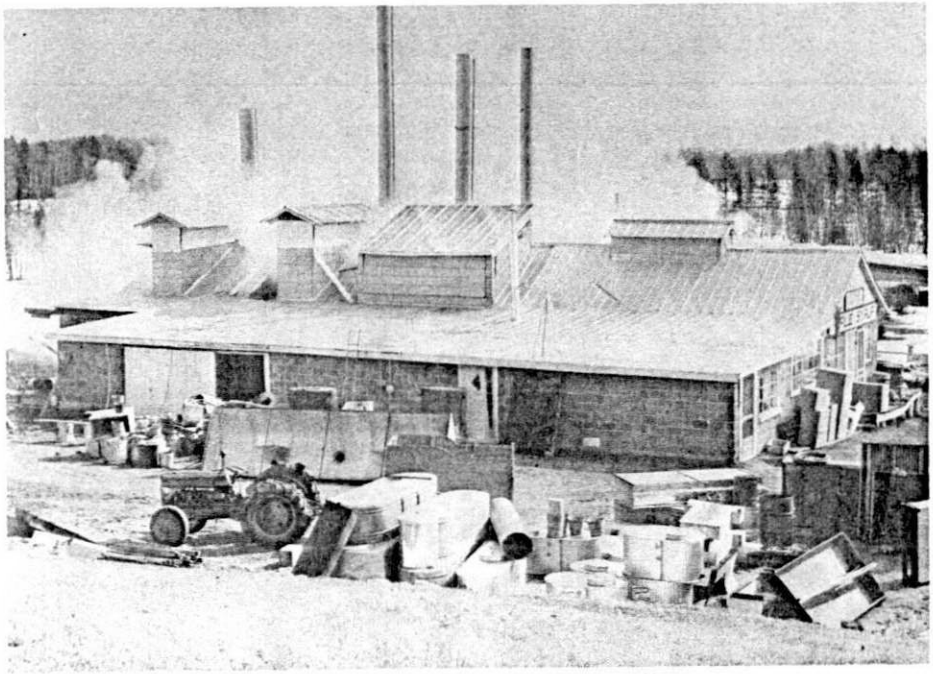


This is one of the two plants owned and operated by **Adin Reynolds** and his two sons. Located in Aniwa, Wisconsin, it is the largest single maple producing plant in the world, processing the sap from over 50,000 taps.

Ray Norlin, Ogema, Wisconsin built this plant strictly for central evaporation. All sap processed here is purchased.

water system at each plant plus $75 annually for depreciation and maintenance.

Rest room furnishings, plumbing, septic tank, and tile lines in each location are estimated to cost $500.

Office equipment includes a desk, an adding machine, a filing cabinet, and miscellaneous supplies. A small space heater also is included for each plant.

Other installation charges for the burners, tanks, pumps, etc., depending upon the size of the plant, and for electric wiring, are estimated.

Finally, miscellaneous items of $800 are included to cover items which may have been over-looked.

Costs of Processing Sap into Syrup

In order to better understand the nature of costs, they often are divided into those which are fixed and those which are variable. Fixed costs must be paid regardless of the quantity of sap processed in a given season, or even if none is processed. Variable costs, on the other hand, depend upon the quantity of sap processed. Some costs are not clearly one or the other, but in this report all are classified as either fixed or variable. These two added together make up total costs. These costs are summarized in Tables 4, 5 and 6.

Labor

The labor force included 1 supervisor budgeted at $100 per week for 6 weeks. This is 1 week more than the estimated 5-week processing season. In addition, hourly help is provided to relieve him at night during the 12 days when, according to estimates, the plants will operate 22 hours per day, and to assist him in filling syrup cans, receiving sap, determining its degrees Brix, keeping records, etc. The amount of hourly labor required depends to some extent on the output of syrup. Hence it is related to the degrees Brix of the sap. For Plant A, for example, with 2.4 Brix sap, 437 hours of labor over and above that provided by the supervisor are included. This labor is budgeted at $1.50 per hour. The total labor cost for the supervisor and hourly help is $1,255.50.

Cost per gallon of syrup.—Many factors affect the cost of processing sap into syrup. Among these are the over-all investment in plant and equipment, the level of operating costs which in turn depends upon the efficiency of the plant, and the price of input factors such as labor and fuel. Two factors not yet discussed are: (a) Brix of the sap, and (b) size of the plant.

Cost in relation to Brix of the sap.—The yield of syrup from a given volume of sap increases rapidly as the Brix of the sap increases, and this in turn greatly influences the processing cost per gallon of syrup. Producers of maple products, in order to keep costs low, should make every effort to cull trees that produce sap of low Brix. This may mean a testing program. Care should be taken to prevent water in any form from diluting the sap. Buckets on trees should be covered, and if tubing is used, the collection tanks

Table 4.—Fixed operating costs for the three sizes of maple sap evaporating plant.

Cost item	Plant A	Plant B	Plant C
		dollars	
Management	1,600.00	2,000.00	2,400.00
Interest on capital investment	1,517.49	1,912.22	2,320.13
Depreciation, from tables 3A, 3B, 3C	1,502.53	1,931.69	2,369.08
Repairs, from tables 3A, 3B, 3C	752.74	950.11	1,154.07
Insurance	607.00	764.89	928.05
Property taxes	297.43	374.79	454.75
Total fixed costs	6,277.19	7,933.70	9,626.08

Table 5—Costs of processing maple sap into syrup in relation to degrees Brix, Plant Size A.

	Degrees Brix		
°For details, see table 4.	1.6	2.4	3.2
Fixed costs		dollars	
Sum of fixed for plant°	6,277.19	6,277.19	6,277.19
Per gallon of syrup	1.08	.71	.53
Variable costs			
Oil	3,136.32	3,136.32	3,136.32
Heat for syrup holding tank	29.03	43.96	59.17
Labor	1,107.00	1,255.50	1,407.00
Workman's compensation	21.07	22.56	24.07
Social security	33.21	37.67	42.21
Sap and syrup filters	232.24	351.68	473.40
Lithographed cans	2,003.07	3,033.24	4,083.08
Electricity and telephone	110.00	110.00	110.00
Interest on operating capital	71.72	84.91	98.35
Miscellaneous	500.00	500.00	500.00
Sum of variable costs	7,243.66	8,575.84	9,933.60
Per gallon of syrup	1.25	.98	.84
Total all costs	13,520.85	14,853.03	16,210.79
Total cost per gallon of syrup	2.33	1.69	1.37

Table 6 —Distribution of costs when processing maple sap of 2.4 degrees Brix, Plant Size A.

	Costs		Proportions		
	Total dollars	Per gal. of syrup cents	Total costs	Fixed costs per cent	Variable costs
Fixed costs					
Management	1,600.00	18.2	10.8	25.5	
Interest on capital investment	1,517.49	17.3	10.3	24.4	
Depreciation	1,502.53	17.1	10.1	23.9	
Repairs	752.74	8.5	5.0	11.8	
Insurance	607.00	6.9	4.1	9.7	
Property Taxes	297.43	3.4	2.0	4.7	
Sum of fixed costs	6,277.19	71.4	42.3		
Variable costs					
Oil	3,136.32	35.7	21.1		36.6
Heat for syrup holding tank	43.96	.5	.3		.5
Labor	1,255.50	14.3	8.5		14.7
Workman's compensation	22.56	.3	.2		.3
Social security	37.67	.4	.2		.3
Sap and syrup filters	351.68	4.0	2.4		4.2
Lithographed gallon cans	3,033.24	34.5	20.4		35.4
Electricity	100.00	1.1	.6		1.0
Telephone	10.00	.1	.1		.2
Interest on operating capital	84.91	.9	.5		.9
Miscellaneous	500.00	5.7	3.4		5.9
Sum of variable costs	8,575.84	97.5	57.7		
Total fixed and variable costs, and percentages	14,853.03	168.9	100.0	100.0	100.0

should be protected from entry of snow or rain.

Cost in relation to size of plant.— With 2.4 Brix sap, total processing costs per gallon of syrup are $1.69, $1.54, and $1.47 from the smallest to the largest plant, A, B, and C. The drop in cents per gallon is twice as much between A and B as it is between B and C. This relationship of cost to size is characteristic of cost curves for all businesses with fixed investments. It is quite certain that if a plant smaller than A is constructed, the costs per gallon of syrup will rise significantly. If a plant larger than C is constructed, the costs will decline, but less rapidly.

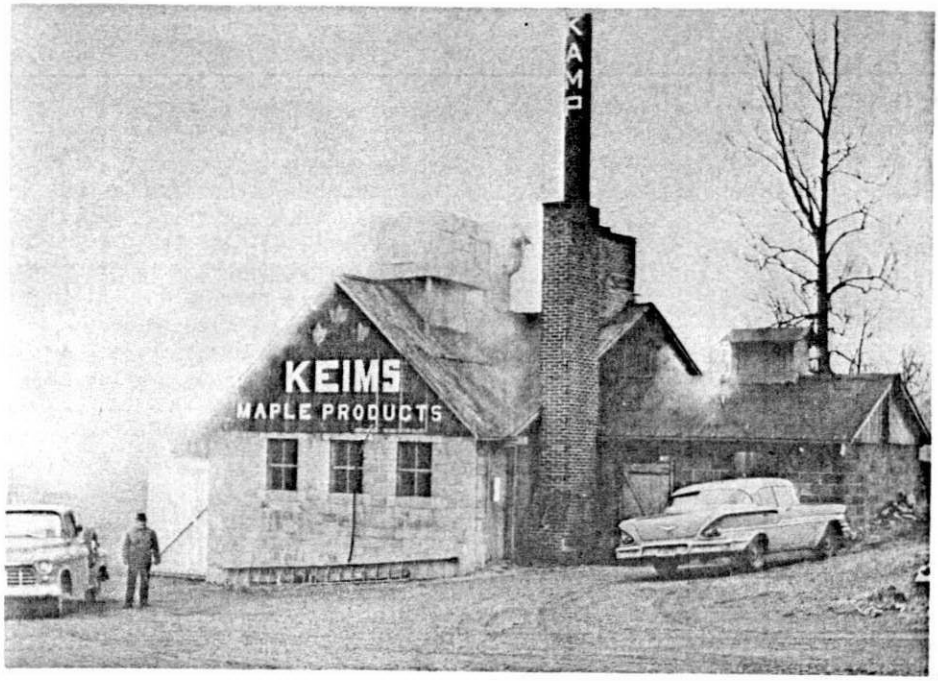
Returns to Sap and for Contingency Fund

Up to this point all processing costs have been accounted for, including a charge for capital investment. After these costs were calculated, itemized, and totaled for the season, they were allocated on the basis of cost per gallon of syrup. The latter figure was then subtracted from the selling price per gallon at the plant, leaving a residual. This residual is the return to the sap.

Prudent management during the first few seasons of operation would set aside some of this balance for a contingency fund. While conservative assumptions and generous cost estimates have been made in this study, they apply to a period of years which averages out the "good" and "poor" maple seasons. In an unusually poor year the contingency fund could be drawn upon to cover the fixed operating costs of the plant, which must be paid in full even if very little syrup is produced. Also, though the maple season may be a good one during the first year of operation everything, including the supply of sap, is unlikely to be so well organized as to demand plant operation at full, planned capacity. Experience will soon indicate how much should be set aside for the contingency fund. Furthermore, the person or persons supplying the capital may desire in the beginning a somewhat higher return on the investment than the 6 per cent budgeted, due to possible risk.

After these allowances have been made, and unless the contingency fund has to be replenished, or a return on investment of higher than 6 per cent is charged, the returns to

(continued on page 12)



George Keim and his sugar house in West Salisbury, Pennsylvania. Two 100 H.P. Steam boilers are used here to produce syrup and sugar.

J.L. Sipple & Son, Bainbridge, New York own and operate this plant, producing, in a normal year, about 7,000 gallons of syrup from 15,000 taps.

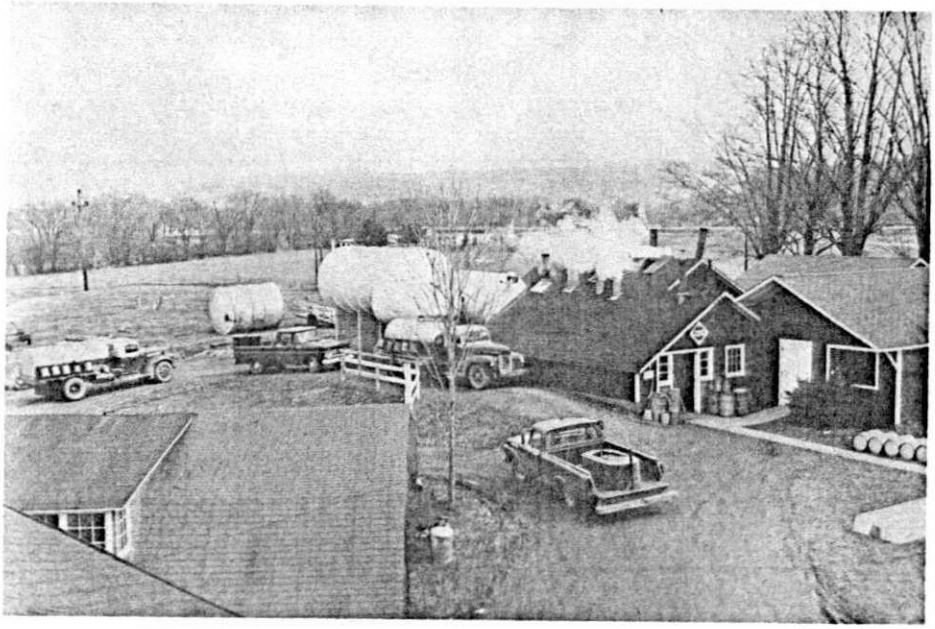


Table 7 —Amount remaining as returns to sap and for contingency fund in relation to degrees Brix of sap and price of syrup, Plant Size A.

Price of syrup	Degrees Brix of sap							
per gallon	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
	- - -		returns in cents per gallon of sap				- - -	
$7.00	5.6	8.7	11.7	14.8	17.8	20.9	23.9	27.0
6.00	4.2	6.8	9.4	12.0	14.6	17.2	19.8	22.3
5.00	2.8	5.0	7.1	9.2	11.3	13.5	15.6	17.7
4.00	1.4	3.1	4.8	6.4	8.1	9.8	11.4	13.1
3.00	—	1.2	2.5	3.6	4.8	6.0	7.3	8.4

sap would be the full amounts shown in Table 7. It should be noted that the value of the syrup to the processor, on which he pays for the sap, should be equal to the wholesale price at the plant, with a reasonable amount deducted for marketing and handling expenses. It would also be an average price for all syrup produced including the lower grades.

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HOWEVER . . . Every time we try to improve it, it costs more. In fact, every issue seems to cost more whether we improve it or not. Right now we would be very pleased to accept your contribution.

Many producers have sent us a Dollar or more to show their appreciation. Have you sent yours?

The Maple Syrup Digest, Bainbridge, New York

WE WISH TO INFORM OUR FRIENDS THAT:

On May 1, 1963 The Leader Evaporator Co., Inc., passed from the family of its founder, the late W.E. Burt. Since his death in 1955 the business has been carried on by his widow, Mrs. Lucille R. Burt. The Leader Evaporator Company originated in Enosburg Falls, Vt., in 1888 and moved to its present location in Burlington, Vt., in 1908.

The present group of owners have all been connected with the Maple Industry for many years. No doubt you will recognize some of them. Lester C. Brown will continue as manager under the direction of the Board of Directors.

The new owners and directors—pledge their support to upholding the traditional leadership of their company and its products; its continued operation, assistance to the Sugar Maker and to keeping an eye to the changing needs of the Industry.

Fortis H. Abbott, Vt.; Leonard D. Bombard, Vt.; Charles R. Branon, Vt.; Lester C. Brown, Vt.; Harold W. Cook, N.Y.; Robert G. Coombs, Vt.; Wyman W. Manes, Ohio, owners and directors.

Research (Continued)

University which resulted in an analysis of the economics of this operation. These are only a few of the problems that have been solved through farmers, manufacturers, and research people working together as a team.

The marketing of maple products is one of the problems facing maple producers. This problem will become more acute if production increases due to improvements in technology and/or as a result of greater imports from Canada. The Pennsylvania State University has been asked to do research on this marketing problem. In order for this research to be successful a team effort between maple producers and research personnel is required. Shortly after the first of November you received a questionnaire pertaining to your production and marketing procedures. By completing and returning this questionnaire you will be aiding the maple industry in this research effort. If you have not already completed and returned the questionnaire, please do so at your earliest convenience. Results of this research will be made available to you through your state producers associations and extension services as well as through ***The Maple Digest.***

We wish to thank the National Maple Producers Council and Lloyd Sipple, Editor of ***The Maple Digest,*** for the opportunity of bringing this message to you.

Reed D. Taylor
The Pennsylvania
State University

The above group attended the fourth annual meeting of the National Maple Syrup Council. It was taken in front of the Fenimore House, head office of the New York State Historical Association. The Council boasts 100% attendance at this meeting, which is remarkable considering the territory involved. Pictured, left to right: Lee Schuler, Burton, Ohio; Fred Winch, Ithaca, N.Y.; Murray Benjamin, Burlington Flats, N.Y.; Mrs. Murray Benjamin, Burlington Flats, N.Y.; Herbert Stanton, Cherry Valley, N.Y.; Mrs. Leon Wright, Franklinville, N.Y.; Leon Wright, Franklinville, N.Y.; Ture Johnson, Burton, Ohio; Herbert Folken, Washington, D.C.; C.O. Willits, Philadelphia, Pa.; Ted Harding, Athens, Me. Ed Farrand, State College, Pa.; Eric Nye, Milton, Vt.; Ted Peterson, Madison, Wisc.; Bob Lesure, Ashfield, Mass.; Adin Reynolds, Aniwa, Ray Foulds, Burlington, Vt.; Putnam Robbins, East Lansing, Mich.; Mrs. Ted Harding, Athens, Me.; Lin Lesure, Ashfield, Mass.; Mrs. Adin Reynolds, Aniwa, Wisc.; Lloyd Sipple, Bainbridge, N.Y.; Mrs. Elizabeth Davis, Montpelier, Vt.; George Keim, W. Salisbury, Pa.; Kenneth Bascom, Alstead, N.H.; Bob Huxtable, E. Lansing, Mich.; Mrs. Kenneth Bascom, Alstead, N.H.; Mrs. Lloyd Sipple, Bainbridge, N.Y.; Dale Brown, Cooperstown, N.Y.; Mrs. Robert Lamb, Liverpool, N.Y.; Mrs. Fred Winch, Ithaca, N.Y.; Mrs. Lin Lesure, Ashfield, Mass.; Mrs. George Keim, W. Salisbury, Pa. — Photo courtesy Bob Lamb

CLASSIFIED

FOR SALE – 5 HP Steam Boiler, steam jacketed, 10 gal. cooking kettle, syrup pump & ¼ HP motor & 50 gal. copper heating tank, crystallizing equipment moulds, etc. **READ ADAMS**, Greene, N.Y.

MAPLE TUBING and other supplies by Lamb; electric tappers, pumps and mailing cartons at a saving. Send for 1964 tubing book of prices. **K.O. PROCTOR** Poultney, Vt.

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Drops in Bucket

(Continued)

nique–cooking his pancakes on his 20-foot evaporators covered with grills!

* * *

Probably the least publicized maple area, Highland County, Virginia, has one of the best participation programs for maple promotion. The Highland County Chamber of Commerce at Monterey publicized the "drive it yourself" maple tour for the 5th annual festival. Held on the 16th-17th and 23rd-24th of March, a small brochure outlined the tour to the sugar camps and some of the camps listed tallied over 2,000 per day! Even the Monterey Hotel features Highland maple syrup on excellent pancakes–the year round! Syrup there sells at prices the northern producers would blush at ($1.00 per pound in small quantities) but these folks ***know the value of their product.***

* * *

The changing picture of agriculture in the maple belt makes maple more and more important to those wishing to live on the land–and make a comfortable living! Each year a few more dairymen feel the squeeze and push over into larger producers. New and improved "sugar works" spring up (and frequently it's in conjunction with other "minor" crops) maple and Christmas trees; maple and blueberries; maple and walnuts; maple and recreation; maple and apples are combinations that appear frequently these days and enable the producer of these crops to make a good living especially as he gets into maple sugars, maple cream and other confections. Lin Lesure, President of the Maple Council, capitalizes on maple, on Christmas trees, and is working into blueberries as a third outlet. He is expanding his kitchen where he serves waffles and syrup to those who visit his place for cold weather sales of syrup and Christmas trees.

by Fred Winch

LAMB'S Corner

MAPLE FOLK

There comes times when an old nut like me gets to argufying with himself while he's hiding out under a flat rock on a mountain side some place or other. Being thankful for all the good things that have happened, and all the bad things that did not happen, I'm just a wondering what you and I'd a done all over again, if our foresight had o'been as good as our hindsight.

After 35 years of traveling over a million and a half miles in the land of the Maple tree among my kind of people—you people—making a living in spite of the dad-burned government, not because of it; and not spending any more time in jail or getting fined for some dasterdly crime I didn't even know about, I'm very grateful. How much easier it would have been if my wife had been rich.

Well, another year has just about shot its wad, and outside of working like the devil to get ready for summer or for winter and never making it, I think we are all a pretty regular, friendly bunch of people, with both feet on the ground. It's just too bad there aren't more folks like us in the crowded areas of our land. We're a people that have always worked for all we got and have been thankful for it, and we don't desire anything that we can't get by working for it.

People are pretty much the same whether you are in the northeast corner of Vermont, in the woods with Hugh Smith, or in northern Wisconsin with Adin Reynolds, or north of the St. Lawrence in Quebec where English is almost unknown. There are many more important reasons for good sound fellowship than a common language. These people are as sturdy as the Maple tree and you can just bet their kind will be around the woods just as long as the Maple tree and that's gonna be a long time.

If I lose my way, an old gentleman comes over to my car, checks me out in a second, and says "Be ye a needin, or are you lost?" and I tell him "I ain't lost, Wigwam lost."

In the back country of Quebec, a fellow comes over to help me. He can't speak English and I can't speak French. I point to a place on the map, then stand there for five minutes while he carefully explains every turn and corner to me. And so I go on, proud to have met that man. He's a right guy and he's not cussing me out for getting lost.

In comparison, during my last forced trip in New York City, I was going slowly along northern Broadway, completely befuddled, and a car full of people came up beside me and called me everything they could think of for making so much trouble. All I could say was "I'm lost, no compass." If those same people got lost up in our country, they'd get help and wouldn't need a compass.

I think back 30 years when I was working for the LaRayshaws. I filled my pipe with Mechanics Delight and promptly started a coughing and a wheezin and Frank set back there a grinning. Next I tried a pipeful of Growler tobacco out of a cloth bag about the size of a bale of straw and just as dry. The Growler caused me to take immediate census to see if the back of my neck hadn't been eat out or exploded and I started a cussin' and a grumblin'. Right then things had gone far enough. Phoebe, the wonderful woman, had had enough. She informed me in the best, clearest, log skiddin', horse handlin' language ever used, that I could make fun of Frank's tobaccy but Growler was her tobaccy, and by criminy, no one was big enough to run her tobaccy down and that included me.

Another time I started for Cranberry Lake, to my hunting camp, in a whale of a storm. The wind was a coming out of a mountain valley like it was being chased by a bobcat. As soon as I got out in the middle of the lake it was simple: I just wasn't going to make it. The boat just filled up with water and went down, and I started swimmin'. About half an hour later Bill Streater came along with his 26 footer a standing on one end and then on the other and a rolling like crazy. When he came along side of me, he noticed his pipe had gone out, and as there was nothing to get excited about, he lit her up again. Then he yells over and says "Sorta rough out here for swimmin', ain't it," and I agrees with him. Bill had covered the whole situation pretty well, no need for me to make idle talk. But all the time I knew, and Bill knew, he would have hurried to help me if it would have been necessary. We both understood without English or French talk.

Little things grow on a man as the years go by, and as we set on a mountain side we got a lot of things to be thankful for. To sum it all up, 90% of what we are thankful for are the people we know or have known. Without our kind of people we wouldn't have much. Maple people, whether they boil in a flat pan outdoors or with an oil burner with a covered evaporator, are all the same, talk the same language, and are friends on the same level.

This issue of the ***Maple Digest*** is pretty well aimed towards the Central Evaporator from Maine to Minnesota. I do not feel that there is anything that can put more "off season" money in a rural community where it is needed than a Central Evaporator Plant. These plants will produce a more uniform product at a lower cost which is what we need more than anything else to sell maple syrup.

I feel that in all our Maple operations, if something is not done in some small way each year to make a better and more profitable operation, we should nail a board across the bottom of the door to remind us, each time we trip over it, that a year has been lost.

I have been told that the average consumption, each year, of Maple Syrup for every man, woman and child in the United States isn't much more than a good sized shot of whiskey. I have also been told that the consumption of wine for every man, woman and child in the whole world is 2 quarts per person a year.

We have a wonderful product, but I just can't help thinking that there's so much room for us to do a whale of a lot better job of promoting and selling Maple Syrup.

Bob Lamb

Hi Folks!

We don't want to sell you anything **now.** Just want to wish you

A

Just in case you're interested, we sell Naturalflo Tubing; Flomor Pellets; Electric Tappers and a few other items.

A. C. Lamb & Sons

Liverpool, N. Y.