

MAPLE SYRUP

DIGEST



Vol. 26 No. 3

October 1986

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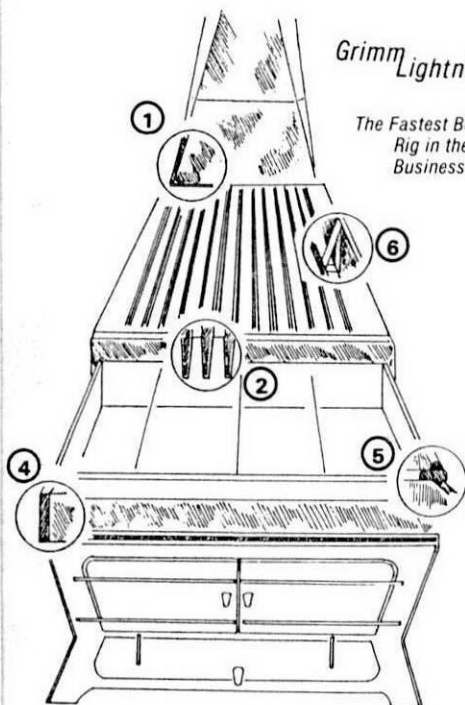
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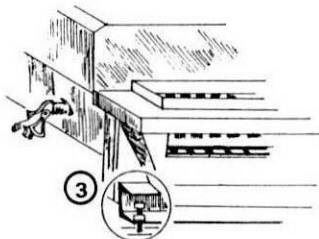
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MAPLE SYRUP DIGEST

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NORTH AMERICAN MAPLE SYRUP COUNCIL

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Editorial

With all the problems farmers are facing now, maple syrup seems to be in the best shape of any crop. The surplus of a few years ago is gone with practically no one going out of business because of it. There is a shortage now but that doesn't hurt the producers a bit. It just makes a higher price for the consumer and possibly a problem for some packers to acquire enough syrup.

There is one problem though that, before it is solved, could reach great dimensions. That is Maple Blight, acid rain, sap streak, salt, insects caterpillars or anything else that might be included in the general category "Maple Dieback". I've seen many of these problems myself. In the center of a small plantation near my home a 6/8 inch diameter maple just "up and died" and one large limb in the tree next to it died for no apparent reason. The other trees appear to be healthy. I've seen the same thing happen in large woods. Many entire sugarbushes have been completely killed by caterpillars. Roadside trees are going fast, probably from salt or change in water table or cutting roots by grading. We call this asphaltitis, and the tops of maples almost everywhere show dead branches.

It's pretty well recognized now that maple dieback isn't any one thing but a combination of several maladies. Caterpillars (Forest tent, Saddled Prominent, etc.) are simple to control. We just spray at the right time with the right material. The problem is the environmentalists. They begin to raise a fuss when we just think about it. The other diseases are much more difficult. We have to know exactly what they are before we can find a cure. And in the case of acid rain, it involves the whole North American Continent.

This all boils down to a monumental problem that's going to take an im-

COVER PICTURE

Bill Rathbun's new Sugar and Pancake House, North Gransville, N.Y.
See New York Maple Tour story.

mense amount of research to solve. The Federal and State governments have all but abolished funds for our research institutions. This hands the ball over to the maple industry and to carry it costs money. An awfully lot of money.

Where will it come from? That is a real good question. The North American Maple Syrup Council has a committee working on a plan to collect a nominal amount, not to exceed one cent, on every syrup container used. This might be paid by the can manufacturer and the cost of course, would be passed on to the producer or packer and ultimately the consumer. It appears to be the only possible way large amounts of money could be raised for research and be fair to the entire industry.

I hope the Council can come to a definite decision on this proposal in October. We will keep you informed.

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GREETINGS FROM THE CHAIRMAN



“From the Chairman - John Kroll”

Having never been to Vermont, I did some reading and found one writer had listed Maple Syrup as an unusual agricultural crop harvested there. Upon checking into other producing states maple received no mention!

Historically, I wonder how long Vermont has had an active Maple promotion. Certainly it's been awhile. For instance, my Mother-in-law belonged to a study club and in 1937 when they studied states she chose Vermont. The information came from Vermont with samples of Maple syrup for the group to taste. Hers was the only sample product received.

We can appreciate having state organizations, The Digest NAMC, IMSI and any other source that allows us to share information which makes for good PR.

We're looking forward to October 26-28 in Rutland.

-John

AMERICAN MAPLE MUSEUM ACTIVITIES

BY Martha Campany

Since it's opening in May, several area fourth grade classes visited the American Maple Museum. Bus loads of senior citizen groups toured the Museum. A group of exchange students representing Ireland, South Africa and other foreign countries was guided through the Museum, as was a Senior High Class from West Canada Central School.


Areas outside of New York State

from which people traveled to visit the Museum are: Massachusetts, Vermont, Pennsylvania, District of Columbia, California, Florida, Maine, West Virginia, Louisiana, Texas, Hawaii and Canada.

On July 1, volunteers held an ice cream social to raise funds for additional repair work to the Museum. During the Lewis County Fair, ice cream sundaes and cones were sold in the maple producers sugar shanty on the fair grounds, the proceeds to be used to help defray the expenses of the New York State Maple Queen Pageant.

On September third and fourth volunteers operated a concession stand at the Lewis County Agri-business Field Days, and on September sixth and seventh served pancake breakfasts at the Museum in cooperation with the Croghan Lumberjack Festival.

Additional items have been donated for the room which was renovated during the past winter. The flag pole has been repaired and replaced. It has been a busy summer for many volunteers.



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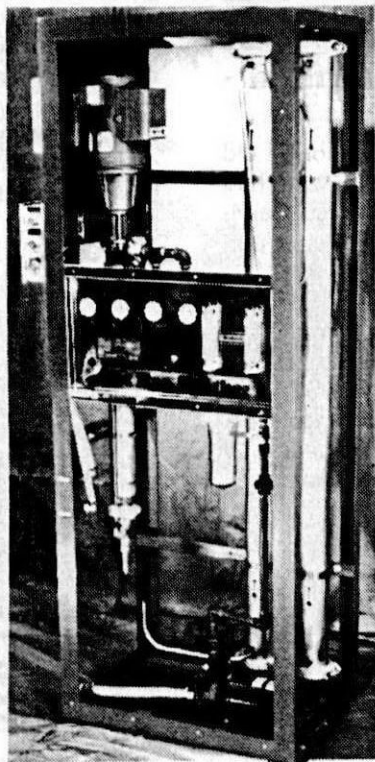
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VERMONT NEWS

ACID RAIN

At meetings on May 7 and August 6 the Vermont Maple Industry Council has heard reports about acid rain (acid deposition) and action being taken to correct the effect of it on sugar bushes. There is need to develop nation-wide concern about it; and find ways to treat trees, soils, and waters affected by it. At the August 6 meeting an engineering firm in the Burlington area which has developed efficient and economical systems for navigating aircraft may be able to develop a way to treat soils and waters economically from the air with lime, potash, or other chemicals to counteract the effects of acidity.

Acid rain and possible solutions to the problem will be discussed at the I.M.S.I. meeting scheduled at the Holiday Inn in Rutland, Vt. on Oct. 29.

Dr. John Donnelly at U.V.M. is working with a team during the summer to determine better ways to measure the effect of acid rain on vital elements in living trees, also the effect of undesirable elements in particular growth rings of the wood in living trees. Speakers at the I.M.S.I. meeting will include representatives of Laval University, the Univ. of Vermont (Dr. Richard Klein), MacDonald College (A.R.C. Jones), and Yale Univ. (Dr. Bormann). Senator Stafford is also expected to be present.

MAPLE ESSAY CONTEST

Results of the Vermont Maple Essay Contest, conducted by the Vt. Maple Promotion Board in cooperation with the Vt. Maple Festival, were announced recently. A total of 181 students took part throughout Vt. There were six Districts, with the Franklin-Lamoille having the most participants (64). Chittenden-Addison was second with 57 contestants. Winners (first, second, and third) were selected in each District. State Winners were (1) Erin McKenny of

Swanton; (2) Molly Melanson of Townshend; (3) Alessandro Nivola of Burlington; and (4) Abigail Wall of Dorset. Awards totalling \$245 were made to District Winners. State winners received a total of \$250. There were District Chairpersons who assisted with the Contest, as follows: Dist. 1, Francis Whitcomb; Dist. 2, Robert Howrigan; Dist. 3, Paul Cate; Dist. 4, Sam Cutting; Dist. 5, John Record; and Dist. 6, Robert and Shirley Coombs.

To help with the Contest a Guide was sent to all teachers and students. The videotape, "Proud Tradition", was also available. In 1987 it is planned to send materials to Science and Biology teachers as well as to English teachers.

RODENT SURVEY

Results of a rodent survey of sugar makers conducted by Dr. Albert Smith of the UVM Agr. Exp. Station and his Committee show that, among 199 sugar makers who responded, there was up to \$5,000 in damage, and an average of \$400. It appears that there is annual damage from rodents to the Vermont maple industry of about \$225,000. The Committee is working on a possible way to control rodents. Existing methods used in apple orchards either are not legal or will not work in Maple orchards. Apparently the rodents chew on tubing and spouts because they have to gnaw on something, and it is convenient. Removing softwood trees which provide their food does not always work.

PLANS FOR N. A. MAPLE COUNCIL MEETING, Oct. 26-28

Bill Clark reports that plans for the Annual Meeting of the North American Maple Council call for registration and a Vermont Dinner on Oct. 26 at the Holiday Inn in Rutland, Vt. The speaker that night will provide information on Vermont. On Monday, Oct. 27, a breakfast from 7:00 to 8:00 a.m. will be followed by a Council business session.

From 11:00 a.m. to 12:00 there will be a technical session; with another technical session from 1:30 to 4:00 p.m. Lew Staats will speak on the results of recent research in New York. That evening is free (everyone on their own).

On Tuesday, Oct. 28 there will be a second Council business session in the morning. From 2:00 to 4:30 p.m. there will be a color tour to maple stops and others. The maple banquet that evening will feature a keynote speaker.

MAPLE HISTORY COMMITTEE

The Vt. Maple Industry Council has appointed a Maple History Committee to find ways of recording valuable maple information dating back to the days of the Indians; and making it available to both students and the general public. Fred Laing is chairman. Other members are Dr. Mariafranca Morselli of the UVM Botany Dept.; Fred Taylor, former Botany Dept. maple research worker; and Ray Foulds, former UVM Extension Forester. The Committee has met with members of the UVM History Dept., including one who has made a videotape of Vt. folklore; another who

is President of the Vt. Historical Society (Sam Hand); a Middlebury College graduate who has done a senior thesis and prepared a display on the agricultural history of Vermont (Penny Hamlet); also Betty Ann and Donald Lockhart, who prepared the videotape, "Proud Tradition". The Committee's final product should include written material; one or more video-tapes; and an oral product (audio-tape) which will be a recording of some of Vermont's oldest and most knowledgeable sugar makers their sayings and recollections.

A problem faced by the Committee is a source or sources of funds to pay for the desired product. It is probable that many people will be asked to donate their time. Vermont Maple Industry Council members will be asked to help; but they are still in the process of raising funds to help with the research being done by Dr. Melvin Tyree of the UVM Botany Dept.

Aug. 10, 1986

Ray Foulds

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IMSI ANNUAL MEETING

This year's annual meeting of the International Maple Syrup Institute will take place on Wednesday, October 29th at the Rutland Holiday Inn in Rutland, Vermont immediately following meetings of the North American Maple Syrup Council. The meeting will focus primarily on the devastating effects which acid rain has had on the maple industry, and more particularly on preventive and curative methods, which are known to slow down maple dieback.

Many speakers have already confirmed their presence at the conference including Dr. Richard Klein of the University of Vermont, Professor A.R.C. Jones of MacDonald College in Montreal. Mr. Richard Ayres, chairman of the U.S. Clean Air Coalition and Mr. David Marvin, president of the IMSI. Other speakers are expected to confirm their attendance before the end of September. In all, the sessions should prove most informative to all of us concerned with maple decline.

The day will begin at 9:00 AM with the business of the Institute, followed immediately by the sessions on acid rain. The registration fee of \$12.00 includes a hot lunch and one coffee break. The meeting will be over by 2:30 PM to allow a safe return home that evening. Everyone is welcome and you can register by calling (802) 868-7244 or by writing directly to the IMSI.

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**DEADLINE FOR
DEC. ISSUE NOV. 1**

WOMEN'S PAGE

(M.L. Sipple, editor)

CRISP MAPLE COOKIES

3 cups flour
1/3 cup sugar
1 tsp salt
1 tsp baking soda
1/4 tsp nutmeg
3/4 cup shortening
1-1/3 cups maple syrup
1 TB vinegar
1/2 cup chopped nuts

Sift dry ingredients into mixing bowl. Cut in shortening with pastry blender to resemble coarse meal. Combine Maple Syrup with vinegar; gradually stir into flour mixture. Add nuts and drop 1 tablespoon size onto greased cookie sheet.

Can also chill dough and drop tablespoon size, then flatten by stamping with the bottom of a glass. Bake 400 degrees 10-12 minutes.

MAPLE BUTTER SQUARES

(1985-Ontario)

1/4 cup butter
1 cup Maple Cream
1 egg
1 cup flour
1 tsp baking powder
1/4 tsp vanilla
- chopped nuts

Cream together butter and Maple Cream. Then add dry ingredients and nuts. Bake 350 degrees. Cut while warm.

HOT COCA (Ellen Adams)

3 TB Maple Syrup
2 TB cocoa
2 cups milk

Heat Maple Syrup in saucepan over low heat for 2 minutes. Gradually stir in cocoa to form a smooth syrup. Add pre-warmed milk very slowly to cocoa mixture. Blend thoroughly. Heat, but do not boil. Serve with whipped cream sweetened to taste, with maple syrup.

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ONTARIO REPORT

The Ontario Summer Maple tour was held in the Waterloo region in the Township of Woolwich on July 17 and 18. We registered in the St. Jacobs Community Centre which is in the heart of Mennonite territory, a religious group that believes in voluntary Church membership, adult baptism and pacifism. They govern themselves in the observance and enforcement of the doctrine. The progressive Mennonite are fully assimilated to modern society while the Old Order Mennonite follow a rigid lifestyle in an attempt to maintain stability. They use horses and buggies and maintain a specific dress code for men and women.

The first farm we visited after being driven through the countryside on air-conditioned buses was Moses Burkhardt's multi-enterprise business. In addition to basic mixed farming, the production of pallets, fuelwood and of course Maple products keep them busy. Maple Syrup has been produced for the last 30 years and consists of 2900 taps. Of these 1700 are on gravity flow tubing and 1200 are on buckets.

We proceeded on to Roy and Edith Martin's dairy farm and toured their maple operation which started in 1964 and has 1900 taps; 500 are on buckets and Roy just doesn't feel the operation would be complete without using horses to gather sap. In 1983 they built a pancake house which holds 40-50 people and attracts over 600 in it's 2 month season. We ate a delicious salad lunch with all the trimmings and topped it off with strawberry and ice cream over waffles and Pure Ontario Maple Syrup.

We continued on to George B. Martin's fifth generation farm where the sugar bush has been tapped for 65 years. There are 1750 taps on tubing. Vacuum is supplied by a 20c.f.m pump located in a shed and the vacuum is

transferred to the bush by a 1 1/4" dry line.

We headed back to the Community Centre to pick up our cars and went to John and Pat Weber's farm for a chicken barbeque and a lively and entertaining ventriloquist show afterwards.

We met the next morning at N.S. Bauman Ltd. which used to be a clay tile plant but now operates as an alfalfa drying and wood fuel production plant. Sawdust and bark are dried and ground and sorted into three grades--one is burned in the drier, the medium grind is sold as commercial sawdust fuel and the coarse dust is made into pellets and sold as fuel. We then crossed the road and saw bricks being made.

Climbing back into our cars on a very hot and humid day we proceeded onto Albert and Ruby Martin's syrup operation which began in the 1940's. It now has 1050 taps on vacuum and tubing while 100 taps are on buckets.

Dennis and Lori Weber's farm was purchased by Dennis's great great grandfather in 1871. The bush has 1350 taps on bucket gathered by horses. The Webers have been involved with the Elmira Maple Syrup Festival since its inception, hosting sugar bush tours on the festival day.

The 1986 Summer tour came to a close after we had another delicious lunch at Woolner's Lodge. Many decided to go back to St. Jacobs to tour the Maple Syrup Museum of Ontario representing artifacts and equipment from the past to the present. Well worth seeing.

The Royal Winter Fair in Toronto is November 13-22. The Ontario Annual meeting is October 3 and 4 at the LUMINA Resort in Dwight. For details call R. Boothby 705-635-2461.

Bill Robinson

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MAPLE PRICES

BY Frank Majszak
Michigan Field Editor

It has always been a mystery to me, why there is such a wide range of retail prices for our Maple Syrup?

This year the production in the entire Maple region was about 1/2 of average, and the price spread is greater than ever. There are those producers who for reasons which I'll speculate on later refuse to ask a fair price for their product. Twice in the last four years our Michigan Maple Producer Association has had reports from production costs analysis experts at our annual meeting.

Both of those presentations showed that it cost very close to \$16.50 to make a gallon of Maple Syrup. All costs were taken into consideration, including labor, fuel, taxes, depreciation etc. Packaging was not included. Also,

those costs were based on a normal production year of a quart of syrup per tap hole. We all know that many of our overhead costs are constant regardless of how much, or how little Maple Syrup we produce.

For instance, tapping cost, equipment cleaning, depreciation and interest expense remain the same. It seems logical and good business that in a year of shortage like this everyone would follow the trend and ask a fair price. Not so. We all have seen commodities in short supply in the last few years. Coffee, sugar, paper and petroleum to name a few. The prices went way up and never did come back down. Eleven (11) pounds of coffee will cost you close to \$50 bucks.

Now to speculate. Most people involved in Maple are part-timers. They borrow equipment, land, fuel, labor,

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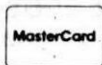
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buildings, tax and interest expenses etc. from their other enterprises they own and therefore, probably don't consider these expenses when figuring their Maple Production Costs. I have heard farmers say, "maple is a fill in prior to spring planting, gives my help something to do." Many times the help is his wife and kids - they work for free. They own tractors, wood lot and bush, so that doesn't get figured into production costs. Diesel fuel, gasoline and electricity costs are paid by the principal enterprise, usually farming, which they are in, so no sense in considering those costs. Like wise with the farm mortgage and taxes. No matter that a face cord of fuel wood is worth between \$30. and \$90., depending on location, that's free too, because it came out of their own wood lot, probably with free labor. With all these expenses not counted -they think they are making money.

Our customer experience here at our farm have been 99% positive. We

raised the retail price of gallons from \$21.95 to \$27.95 and quarts from \$6.50 to \$7.95, other sizes comparable. We wholesale quarts at \$6.60. No way, do we have product to last till next years crop. Most people are well aware of the short Maple crop because of the nation wide reporting of the T.V. networks and news services. We have had only one person so far this year who came into our farm store and not buy.

The following is price information I have gathered by phone:


| <u>Maple Grower</u> | <u>Gallons</u> | <u>Quarts</u> |
|---|----------------|---------------|
| Frank Majszak, Maple City, MI | \$27.95 | \$7.95 |
| Ted Johnson, Toivola, MI | None | \$9.75 |
| Fern Gearhart, Charlotte, MI | 23.00 | 7.00 |
| LeRoy Worden, Honor, MI | None | 7.75 |
| Don Dodd, Niles, MI | 21.00 | 5.95 |
| Willson Clark, Wells, VT | 28.00 to 45.00 | 9.00 to 10.00 |
| Lloyd Sipple, Bainbridge, NY | 28.00 to 31.00 | 8.50 to 9.50 |
| Fred Winch, Jr., Bradford, NH | 35.00 to 40.00 | 8.50 to 10.00 |
| Russ Davenport, Shelbourne Falls, MA | 28.00 to 34.00 | |
| Juan Reynolds, Aniwa, WI | 34.00 | 10.50 |

It is obvious there are a lot of Maple people missing the boat. Sales lost because of price are almost nill. Juan Reynolds of Reynolds, Inc., Aniwa, WI said virtually the same, that in spite of substantial price increases to their large chain stores, Syrup sales are good and he has not lost any accounts.

One further thought, this is a free country and a Maple Producer can give away the fruits of their labors if they so desire, but those part-timers selling Syrup at or below production costs ought to give some thought to what they are doing to the guy down the road who is depending on Maple for a living.

There are a lot of good farmers who are not good business managers.

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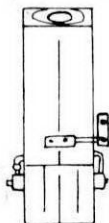
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by

Paul E. Sendak

Forest Economist

USDA, Forest Service

Northeastern Forest Experiment Station

P. O. Box 968, Burlington, Vermont 05402

Frederick M. Laing

Research Associate Professor

Botany Department

University of Vermont

Burlington, Vermont 05405

Sendak and Laing : 2

With rapidly rising oil prices during the 1970's, efforts were made to reduce the amount of energy needed to make maple syrup. High cost-high tech innovations such as reverse osmosis found applications in the maple industry, dramatically reducing energy needs. Lower cost-low tech innovations applied to the standard open-pan evaporator produced less spectacular results but found wide acceptance. The sap preheater is an example.

Another low cost-low tech innovation is the forced-draft wood grate. Air space area in the grate is reduced compared to the air space area in the standard wood grate. But the draft is forced through the restricted space with blowers. Thus, the velocity of the air flow through the grate is increased compared to the natural draft using standard grates. The resulting improvement in combustion and turbulence in the hot gases should improve the overall thermal efficiency of the evaporator.

We installed a commercially available forced-draft grate, the Wood-Saver,¹ on a 5 x 12-foot evaporator to compare its effect on thermal efficiency with that of standard wood grates. We also tested the effect on thermal efficiency of boiling wood versus sap, and the effect of water moisture content.

Methods

Test Unit

The test unit was a 5 x 12-foot Leader

Special (drop flue) evaporator that was located at the Proctor Maple Research Farm, Underhill, Vermont. The evaporator was installed on a brick-lined metal arch. The flue pan was 5 x 7 feet and the syrup pan was 5 x 5 feet. The flue pan was covered with an aluminum steam hood fitted with standard wood grates for comparison with the forced-draft grates. All tests were run first on the standard grates because the firebox required modifications to accommodate the shorter forced-draft grates and blower ducts.

Fuelwood

The fuelwood was cut to length, 27 inches for the forced-draft grate and 42 inches for the standard grate. The wood was split and stored at Proctor Maple Research Farm. Half the supply was cut in the summer of 1983 and the other half cut in the summer of 1984. The wood was sound, mostly American beech and sugar maple.

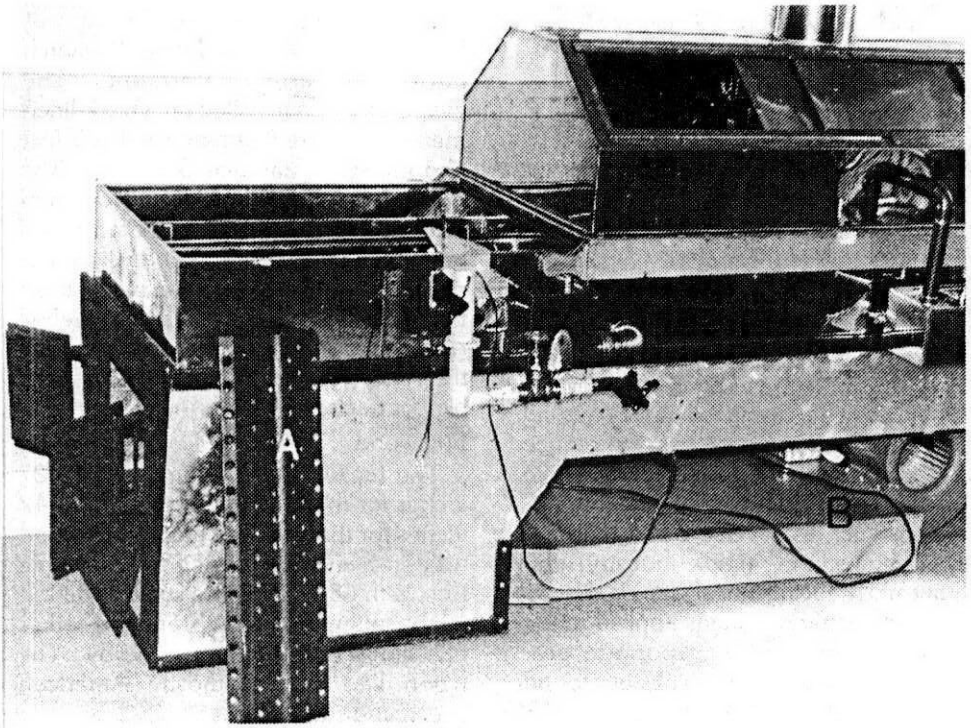
Data Collection

Data were collected during sixteen 6-hour runs (2 grate types x 2 wood moisture levels x 2 evaporator mediums x 2 repetitions of the entire experiment). The tests were conducted in March and April, 1985. The following data were collected:

1. Amount of water evaporated and sap processed per hour.
2. Weight of wood burned per hour.
3. Moisture content of wood fuel.
4. Weight and sugar content of syrup produced per hour.
5. Temperatures of wood, water, sap, syrup, air, and stack gas.
6. Relative humidity.
7. Barometric pressure.
8. Stack gas composition (CO₂ and O₂).
9. Sugar content of sap.

Analysis

The data were used to calculate thermal efficiency for each test run. In



addition, heat balance was analyzed as an approximate check on the efficiency calculation and to show where heat losses occurred. The data were analyzed statistically. We used analysis of covariance with grate type, wood age, and evaporator medium as factors, actual wood moisture content as covariate, and thermal efficiency as the dependent variable. The Durbin-Watson statistic was calculated to check for serial correlation because the need for arch modification required that all tests be run on one grate type first, then the other.

Results

The forced-draft grate resulted in a small but statistically significant ($P < .003$) increase in thermal efficiency. The overall average thermal efficiency for the standard grate with natural draft was 47.95 percent while the forced-draft grate averaged 51.81 percent, an increase of 8.1 percent --(51.81 - 47.95) 47.95.

None of the other factors tested had a statistically significant effect on thermal efficiency. And there were no statistically significant interactions. In other words, thermal efficiency did not depend on whether we boiled water or sap, used wood that had been seasoned for 1 year or 2 years, or on the actual moisture content of the wood fuel, which varied over the relatively narrow and low range of 17.6 to 26.7 percent (wet basis). Nor did two or more factors combined (interaction) have an effect on thermal efficiency. The test for serial correlation was negative, so the order in which the tests were run had no effect on the results.

The two units used on average nearly the same amount of wood per hour (dry basis)--392.4 pounds per hour for the standard grate versus 394.6 pounds per hour for the forced-draft grate. The sap and water inflow rate averaged over all tests was 174.2 pounds per hour for the

standard grate and 189.3 pounds per hour for the forced-draft grate.

The heat balance analysis showed that the stirring action of the air jets through the forced-draft grate gave a more complete combustion with slightly less air (6 percent less) than the standard grate. This increased the thermal efficiency but also increased average stack gas temperatures--746°F for the standard grate, 838°F for the forced-draft; however, the stack gas losses were nearly equal.

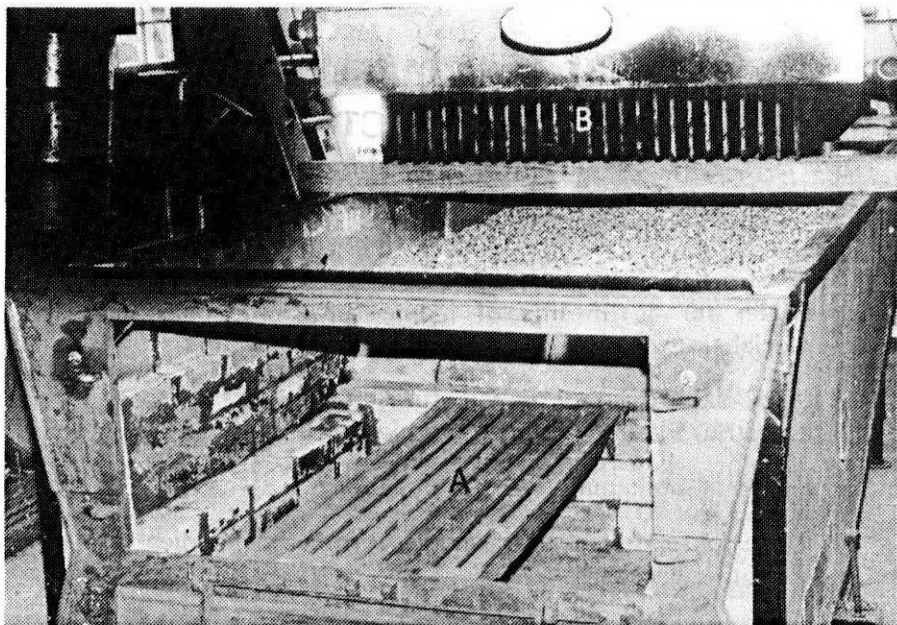
Discussion

In addition to the small increase in thermal efficiency, other noneconomic benefits of the forced-draft grate were evident. The forced-draft grate allowed greater control over the fire, improving the quality control of syrup production. Boiling action in the back pan also was improved, and boiling action recovered much more rapidly after opening the fire door to add fuel.

The increase in thermal efficiency amounts to a savings of about 1 cord of wood to every 12 formerly burned using the standard grate. The labor required

for boiling was about 8 hours per cord burned. Wood at \$65 a cord and labor at \$5 an hour amounts to a saving of \$105 for every 12 cords burned using the standard grate. For the size of evaporator that we tested, \$105 is roughly the annual savings in syrup production cost to produce about 300 gallons of syrup. The small amount of electricity needed to run the motors was ignored in the economic analysis.

A standard wood grate for the test evaporator cost \$450 in 1985 and the Wood-Saver forced-draft grate cost \$1,230. The question is, can we afford to spend an additional \$780 today to obtain the annual cost saving of \$105? Consider the situation in which a set of grates is needed because either the old grates are beyond salvage or a new evaporator is being purchased. Since a set of grates must be purchased and the alternatives are the standard wood grate or the forced draft grate, the analysis focuses on the incremental initial investment of \$780. By making a few assumptions, the before-tax rate of return on the incremental investment can be cal-



culated.

The following assumptions were made:

1. The life of both grates was assumed to be 10 years.
2. The salvage value of the conventional grate in 10 years was 20 percent of first cost.
3. The salvage value of the forced-draft grate was 15 percent of first cost (reflecting that the duct work and blowers would have to be replaced).
4. Annual gross receipts would be equal and disbursements would differ only by the savings of \$105 with the forced-draft grate.
5. Annual inflation would average 5 percent; that is, annual saving and salvage value increase at the rate of 5 percent per year.

Analysis of the resulting cash flows indicates a before-tax rate of return of 12.4 percent on the incremental investment. However, if the noneconomic advantages of the forced-draft grate are

considered along with the fact that the extra investment would generate additional, but small, income tax benefits, the decision to purchase forced-draft grates over standard grates is further justified.

The analysis of cash flow is not particularly sensitive to salvage value because it occurs so far into the future. It is sensitive to annual savings. So relative (real) increases in the cost of fuel wood and wage rates compared to other costs of sugaring would increase the before-tax rate of return for the incremental investment in the forced-draft grate. Similarly, a relative (real) decrease in these costs would have the opposite effect on the rate of return.

FIGURE LEGENDS

Figure 1.--An evaporator showing (A) one grate element from the forced-draft grate and (B) the ducts and blowers for creating the forced draft.

Figure 2.--The test evaporator showing the fire-box with standard wood grate being installed (A). The syrup pan and fire doors have been removed from the arch and the flues from the supported back pan can be seen (B).

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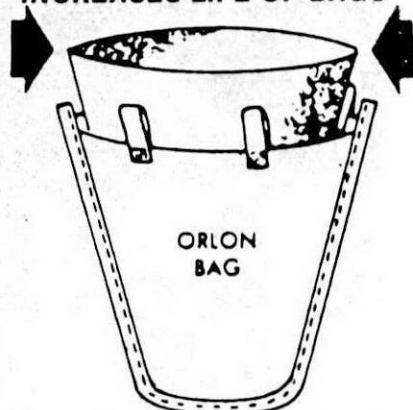
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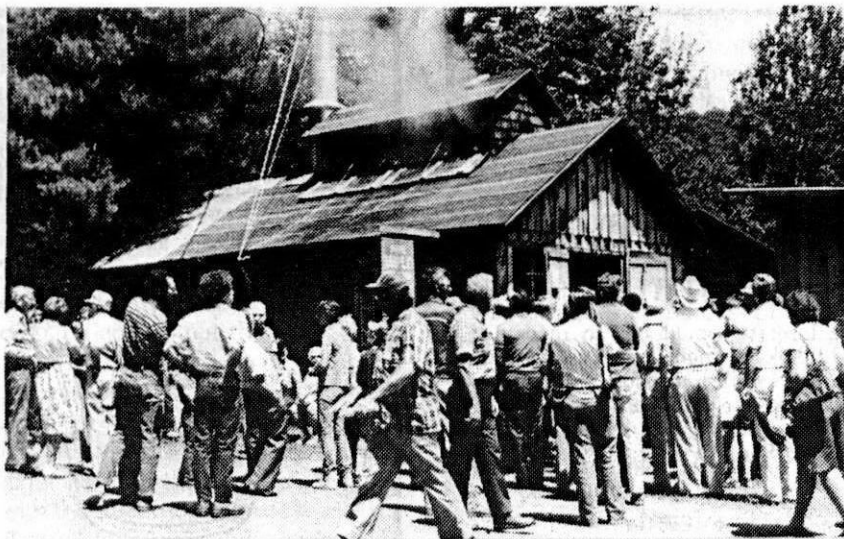
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1986 NEW YORK MAPLE TOUR

The New York Maple Tour departed from Glens Falls across scenic Washington County at noon July 21st. Two-hundred maple producers from Quebec to Pennsylvania enjoyed the rural landscape of dairy farms and small villages on the way to the Sugar House of Steve Rascher, Shushan, N.Y. The roadside sugar house featured a 4' x 12' wood-fired evaporator with preheater hood and wood saver attachment on the fire-box.

Excellent production has been achieved from the approximately 1,000 taps, most of which are on a vacuum tubing system. Steve and his father Sigurd, related unique ideas regarding efficient evaporation methods, retail syrup sales and exceptional sugar bush management.

The tour then turned north to the maple operation of Everett Gould near Granville. Everett discussed the history of the operation and related his many years experience as a maple producer. Lewis Staats, Cornell Maple Extension Specialist, John Hastings, DEC Forester and James Farrar, of Adirondack Fores-

try Consultants discussed the management of a developing sugar bush. Everett's son Dexter demonstrated innovative equipment ideas from tubing cleaners to sap pumps.

The Gould's handle the sap from 1,700 taps with an RO in conjunction with a wood-fired evaporator. Previously, oil fired evaporators were used. Syrup is sold retail and wholesale.

Later in the evening the maple producers reconvened for a banquet. Commissioner of the New York State Department of Agriculture and Markets, Joseph Gerace, discussed the current Agricultural situation and specific initiatives of the department regarding the maple syrup industry. Dick Nason, Operations Manager of Finch Pruyn & Co., Inc., addressed production and other uses of Finch Pruyn woodlands. Rebecca Buel, New York State Maple Queen, Tom Todd, President of the New York State Maple Producers Association, Jim Farrar, President of the Upper Hudson Maple Producers Association and Lewis Staats, Cornell Maple Extension Specialist discussed



Dexter Gould leads equipment demonstration

topics related to the maple syrup industry.

The second day of the tour began with a stop at Jeff Howe's sugar house, Adamsville. This operation featured an all flue pan wood-fired evaporator used in conjunction with a gas fired finishing

pan. Jeff outlined his production on marketing techniques which center around 800 taps of tubing and buckets on leased trees.

For a change of pace, the tour moved to Floyd Harwood's Grist Mill, Hartford. Participants observed the operating mill and toured the out buildings displaying everything from antique farm machinery to historical books.



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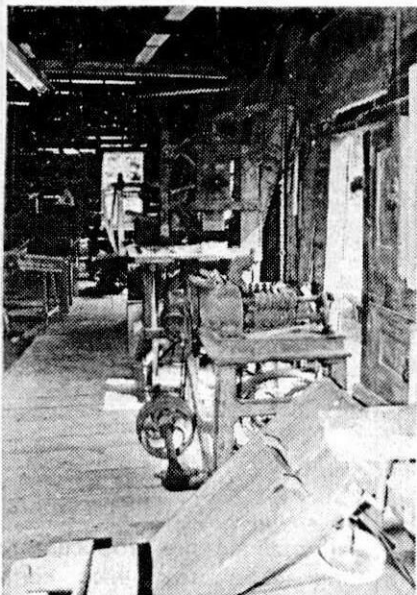
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Antique equipment display at "Grist Mill"

The tour again turned north to the sugar and pancake house of Bill Rathbun, North Granville. In 1986, the Rathbuns produced syrup from 4,000 of their own taps and purchased the sap from 6,000 taps. The sap was processed by an RO and 4' x 12' oil fired evaporator. Maple syrup and products are sold retail at the sugarhouse. The pancake house is operated week-ends. Bill outlined his sap processing operation and retail business. The pancake portion of the business has been a great success. Bill stated it is common for the pancake house to be overrun with customers who regularly wait an hour or more to be seated.

The tour concluded with a jaunt to the top of Prospect Mountain for a breathtaking view of Lake George and the North Hudson Valley.



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275 ENJOY VERMONT MAPLERAMA

By: George L. Cook
UVM Reg. Maple Agent

Some 275 visitors streamed into Vermont for the '86 Vermont Maplerama. Bill Clark, president of the Vermont Maple Sugar-makers Assosiation, figured this to be the 20th such program, the first hosted by Rutland County in 1966.

This year's program, held at Vermont College in Montpelier, involved exhibits, speakers, tours, and competitive events. Two added attractions this year were guest speakers to address Maple Decline and the Maple Olympics. Both appear to be a hit and will likely be suggested for future Mapleramas.

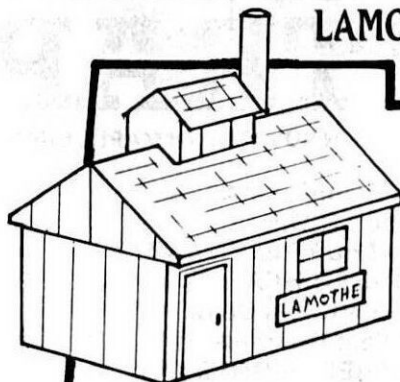
Dr. David Houston and Dr. Walter Shortle, both from the U.S. Dept. of Agriculture, presented very interesting and up-to-date information concerning maple decline and the whole maple tree health situation. The

primary cause of decline appears to be insect defoliation followed by fungal infection. "Maple Decline" itself is a rather generic term used to describe a whole host of problems. Dr. Houston said that you will not find one "Silver Bullet"; rather the problem is a culmination of many stresses on the ecosystem of the forest.

Sugarmakers were given the opportunity to view maple decline in progress during tours of local sugarbushes. Recommendations to producers include: looking more closely at their own bush, watching for signs of early decline; avoid wounding their maples, especially low on the trunk; using care when culling or thinning the bush, never taking one-half of a forked tree trunk, limiting access to the woods during the summer months by heavy equipment, along with keeping livestock out of the woods.

Saturday's tours took folks to see a wood-chipping operation and a wood-chip gasification unit at Lou Bravakis'. After a picnic lunch at the Cabot Recreation Field the

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group visited the David Houston sugarbush in Cabot, half of which he gathers with a team of Belgian horses.

The final stop brought folks to the sugarhouse of Glenn and Ruth Goodrich, '86 recipients of the Ray Foulds' Outstanding Young Sugarmaker Award. The Good-

rich's tap 2000-3000 trees and maintain a clean, orderly sugarhouse. They are always looking for new and better ways to improve their operation and help all sugarmakers promote their product.

The '87 Maplerama will likely be held in Addison County.

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LECANIUM SCALE

This spring and early summer many of us experienced a moist, sticky substance covering virtually everything in the understory of our wood lots and sugar bushes.

Jim Nugent, Leelanau County Extension Specialist provided the following explanation.

The sticky substance is honey dew secreted by crawlers of the Lecanium scale, most likely the European fruit called scale is the dead, brittle body of lecanium scale, but they all have similar patterns of growth and development.

The period of greatest growth is spring and early summer. This is the time when the most damage is incurred by the host plant. The female deposits her eggs during June or early July. As she does so, her body becomes increasingly hemispherical and dry. The so-called scale is the dead, brittle body of the female which protects the eggs until they hatch. Crawlers emerge from beneath the female shell and migrate to the leaves and secrete the sticky substance, honey dew. This secretion felt like a fine mist falling. In late summer second-instar nymphs return to the twigs where they overwinter. Then in spring they resume feeding and much more secretion happens due to their increased size.

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Lecanium scale populations are subject to rapid increases and declines. The female lays about 500 eggs. There is one generation per year.

Fortunately, there are natural parasites which effectively control Lecanium scale. In our area, a fungus has attacked the scale and destroyed the eggs, turning them into white powder like substance beneath the shell (scale). All of the shells I opened in early August on a understory Maple sapling from my bush were dry and dead.

Mr. Nugent's opinion is that there will be some damage, especially to trees that were previously under stress and that there may be a slight loss of sap production both this past spring and in the spring of '87. He, also, feels that the past population has peaked and that it will be some time before populations reach this level again.

Frank Majszak, President Michigan Maple Producers Association Delegate, North American Maple Council Field Editor, MAPLE Syrup Digest



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LIMITING INJURY IN SUGAR MAPLE DUE TO TAPPING

by

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Experiment Station
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Sugar maple (*Acer saccharum* Marsh.) is a unique tree in that it has numerous uses, in addition to its beautiful autumn color. Maples are the favored species for urban planting, the lumber is used to produce a number of high value products, and the tree can be tapped to produce syrup. Unfortunately, serious damage often occurs to maples, and other trees, growing in each of these settings. For a variety of reasons, the average life of a city tree is only 15 to 20 years and replacement costs are enormous for a large city or on a national scale. Forest grown trees are subjected to fire scars, wounds associated with logging, frost cracks, and even natural pruning of dead branches. The primary injury to trees in sugarbushes is the annual tapping for sap production. Every one of these injuries that removes even a small amount of the protective surface on a tree serves as a point of infection that leads to discoloration and potential decay.

In the Great Lakes states, the Northeastern United States, and Southeastern Canada, tapping maples in the late winter or early spring for sap production is an important secondary cash crop for many landowners. Trees are usually tapped when they reach about 10 inches in diameter, and by the time the trees reach 20 inches in diameter they may receive as many as four new tap holes each season. Because tap-holes are drilled at approximately the same height year after year, a maple tree that is able to contain the trauma associated with these wounds can limit internal decay and permit repeated tap-

ping for sap production.

The Genetics Project at Durham, New Hampshire conducted studies on a number of hardwood species (cottonwood, sweetgum, black walnut) to see if the amount of damage that was associated with wounds was random or if it occurred more in one family of trees than it did in other families. If it turned out that it was a heritable trait, that is if it could be transmitted from the parent tree to seedlings from that tree, we could set up seed orchards of 'resistant' trees and produce 'resistant' seedlings. Discoloration and decay around a tap hole or other wound produces a flame-shaped pattern above and below the injury (Fig. 1). Those woodlot owners who have thinned old sugarbushes have noted the considerable discoloration that occurs in the tapping zone of the trees. If that injury could be confined to the area immediately surrounding the tap hole, future taps could be inserted in clear wood for a longer period of time (Fig. 2). Not only would the tree be healthier because more conducting tissue would remain intact, but the tree should produce greater quantities of sap. With that in mind, and with the encouragement and support of the North American Maple Syrup Council, the Northeastern Forest Experiment Station, using an existing test planting, started a study to answer some of these questions.

In the spring of 1968, a test planting of three-year-old seedlings of 112 open-pollinated families of sugar maple was established on the Fernow Experimental Forest near Parsons, West Virginia. Seedlings from eight parent trees from each of 14 locations around the natural range of sugar maple were planted in a randomized design in two-tree plots in each five blocks. After 14 growing seasons in the field (age 17 from seed), the smallest tree, or the one with the poorest form, in each of the two-tree plots was marked for thinning. In mid-March,

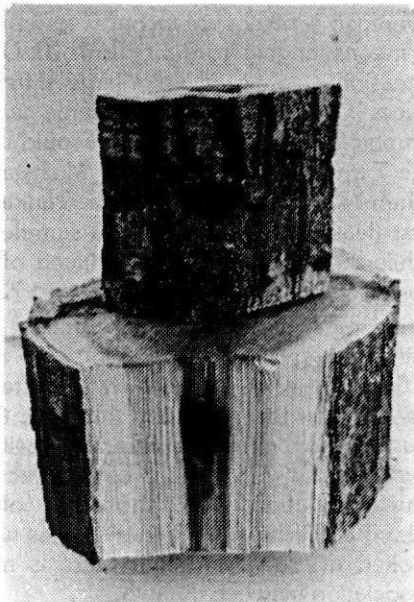


Fig. 1. Discoloration associated with wounds such as tapping for maple sap.

the marked trees were wounded by drilling a 0.5 in diameter hole 1.5 in deep at about 4.5 feet above ground. While



Fig. 2. Different trees showing variation in compartmentalization of discoloration associated with wounds. Tree on left is poor compartmentalizer and discoloration has spread throughout stem. Discoloration on tree at right is restricted to immediate area of wound.

this is not as deep as the standard tap hole, we were able to avoid any 'heartwood' in the smaller diameter trees and still get good measurements. The wounded trees (a total of 73) were cut 7 months later and a 12-inch long section of the stem with the wound in the middle was returned to the Laboratory for analysis.

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A bandsaw was used to cut the sections horizontally through the wound hole and again lengthwise through the wound to the end of the block. A number of measurements were made of the amount of discoloration observed including area in cross-section (which indicates the spread of discoloration around the tree), length and surface area of discoloration above the wound (which indicates rate and extent of spread above and below the wound), and a calculated volume of discolored wood (indicating total tissue involvement).

Of all the measured and calculated values obtained on these samples, only the cross-sectional area of discolored wood measured 2 inches above the wound showed significant family differences. The area of discolored wood

averaged 4.65 square inches with family means ranging from 2.65 to 7.10. On occasions we noted very large differences between trees from the same geographic location. An example would be the 7 trees from Iron County, Michigan where seedlings from one tree ranked first (least discoloration) of 73 sampled while the other six trees produced offspring that ranked 3, 4, 25, 47, and 72.

Average diameters of the families in this planting ranged from about 1.5 to 5.0 inches inside bark which permitted us to check the possibility that area of discoloration might be associated with the size and growth rate of the trees. Our calculations, and those we obtained earlier with the other species we looked at, suggested that there is no association between the two.

In summary, this cooperative research demonstrates that there is probably a good opportunity to select parent trees that will produce seedlings with the ability to seal off (compartmentalize) wounds caused by anything from bulldozer blades to pocket knives. As a result, they should survive longer in urban settings and produce a greater percentage of high quality wood under forest conditions. In sugarbushes, these improved trees would be expected to provide a greater area of 'white wood' for new taps, provide a greater volume of sap, and be less subject to wind-breakage. The fact that there was no association between discoloration and growth rate of the trees should permit us to select for fast growth and resistance to discoloration and decay associated with wounds such as tap holes. We should now be in a position to first screen all trees for sap-sugar levels and then growth rate and compartmentalization of wounds. The knowledge may now be available to produce supertough trees that will grow fast, contain lots of clear wood, and produce large quantities of sweet sap.

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Many factors control sugar content. The percentage of tree top is probably the most important. The more leaves a tree has, the more sugar it will produce. That's why roadside or open grown trees are usually better than woods trees. A heavy seed crop cuts the sugar production because there's less leaves and the seeds use some of it.

The rate of sap flow can also affect sugar content. A slow, "weeping" flow usually causes a little higher sugar content than a fast flow probably because the water has more time to absorb sugar.

Now if all I've said here fails to come true at various times in the future, it's probably because the production of sugar, sap and syrup, I've found, can be extremely frustrating and usually absolutely uncontrollable.

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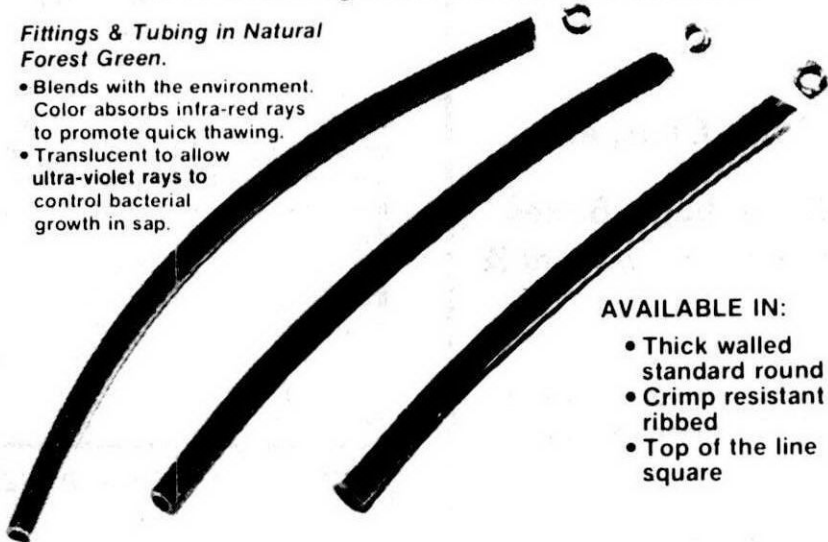
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Dear Editor:

My wife she sez, "Honest Archie, sometimes she calls me truthful Archie, please tell that nice Mr. Editor man about our huge pipe line operation to use the sun as a source of heat to evaporate the sap."

Well, it wuz like this: All over the U.S. is them gas pipelines. Some runs north and south, some east and west. Well, up in the syrup country the elevation is about 2000 ft. above sea level. Down in southern Texas it's at sea level, so why not let the sap run down hill ?

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Now my uncle Louie owned a fleet of tanker trucks so I hired him to haul the syrup back up to our sugar bush so we could sell it. Those trucks all loaded with syrup never made it. They was stopped at the state line. Didn't have a permit to haul syrup.

I suppose them trucks is all still parked there because politics changed and the new political appointees couldn't find the forms to allow the trucks to pass.

Your truthful friend
Archie

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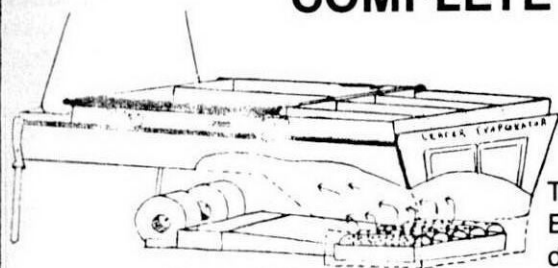
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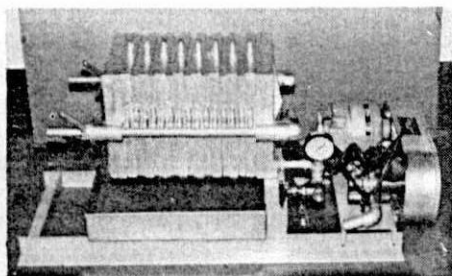
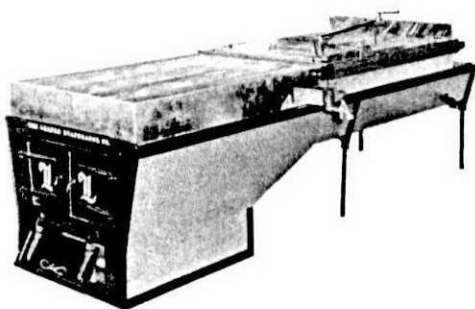
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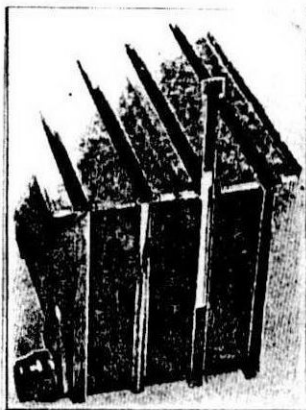
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The advertisement is framed by a decorative border of wood grain. At the top, a horizontal beam of wood contains the company name. Two vertical posts of wood run down the sides, and a horizontal beam of wood runs across the bottom. The wood grain is detailed with various patterns and knots.

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