

# MAPLE SYRUP

# DIGEST



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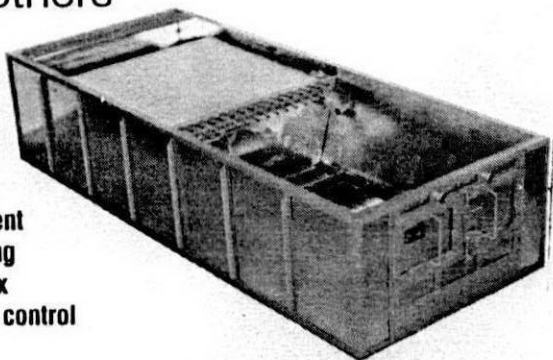
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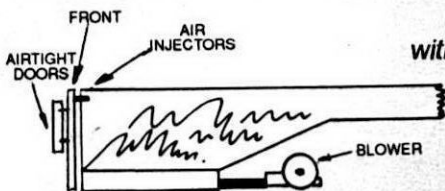
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# MAPLE SYRUP DIGEST

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## GREETINGS FROM YOUR PRESIDENT



All terms, appointments, reigns, and days come to an end. The most beautiful of all endings is evening. The western sky shimmers with scarlet brilliance. The clouds are soft and fluffy. The streaks of splendor extend way beyond the eye. It is truly a fitting end to each day. It's the way it should be. As a day unfolds we all experience some good and some bad. It is a time to resolve the issues. It is a time to reflect. It is time to add up the score. It is time for a conclusion. It is a time to know all is well and at peace. Evening shadows fall. Twilight is enveloping the problems. The world is still. Solitude is deafening. But silence is golden. Peace is truly ours. So listen to hear all that is good. And listen for the sound of happiness. Listen, you really can hear it. This day is over. A beautiful tomorrow is already coming. And life goes on.

Things look good. A maple promotion is underway in the United States, funded by Agriculture Canada and sponsored by the IMSI. This generic promotion is designed for use this fall to stimulate use and provide knowledge about maple syrup. All maple folks shall benefit. The more widespread the coverage, the more effective. If you would like home-town newspaper participation, copies shall be available for you in Nova Scotia, or contact the IMSI office in Montreal.

Getting your newspaper to print these articles is a way you can help. Together we can get a lot of mileage out of this program. We all need to pitch in.

Maple tours, festivals, maple queens, fairs, and exhibits are all great ways to promote our product. Most maple producing Provinces and States have some or all of these events taking place, especially during the summer and fall months. Our gratitude goes to all that work so hard to make these events a success. You know who you are. So do we. Thank you from all maple people for your untiring efforts.

Once again, I would like to express our gratitude to our industry's "old timers". You producers, equipment manufacturers, dealers, extension persons, all departments of agriculture, forestry personnel, and researchers. You of days gone by have done yourselves proud. You have paved our path. You deserve thanks. We owe you a lot. So to those active in maple, retired, and to those passed on, we thank you.

The Maple Museum and Hall of Fame in Croghan, is truly an inspiration to maple. As one walks through this collection of "maple past", we realize just how lucky we are to have this place of maple tribute. We can all feel part of this place. It is like walking on a hallowed ground of memories. We thank those that operate the facility. Thanks to Bob and Florence Lamb who had the foresight to make sure it really did happen. This museum gives us all a place to remember and reflect ourselves into



maple history. We can best protect this monument by financially supporting this treasure. Visit, enjoy, and give to your museum.

The research fund has become so common place that it hardly gets mentioned anymore. It is doing its job year after year without recognition. Your penny per container is generating the seed money for desperately needed research. Thanks to all that contribute. Thanks to all of you that collect. And yes, thanks to those that perform the research.

Maple is going to Russia. The Eisenhower Foundation for the "People to People" Ambassador Program is sponsoring an informational exchange trip to Russia and Eastern Europe between the maple and birch syrup industries. The trip is scheduled for June 1994. An-

other trip is tentatively planned to China in 1995 for exchange between China's sorghum industry, and the maple industry of North America. Details are sketchy, but cost will be in the \$3-\$4,000.00 range. We need to save our nickels. This will be a trip of a life time, but one within our own industry. More details will be forthcoming.

Promotion — promotion — promotion. Remember these three words. They will either be our best friend or will come back to haunt us if we do not act. In my opinion, whether God gives us a surplus or creates a shortage, neither is an excuse for our failure to develop and maintain an organized, ongoing promotional program. I hear comments like; "We had a short crop", "The surplus is going



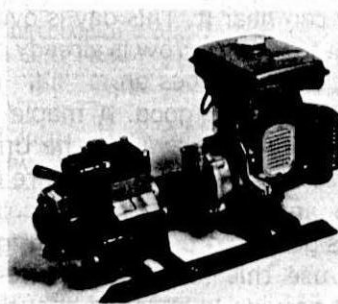
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down", and "We don't need to spend promotion dollars now". This is probably the largest fallacy that can be imagined. We have the finest product in the world. We just need to make sure everyone knows it. To do that, we need to keep on telling them over and over and over. **WARNING.** Do not let the promotion board idea die. We need it. It is within our grasp. We must do it now while the idea is fresh and alive. Give the IMSI Promotion Board your support. The foundation is there, we just have to build on it. Quebec, we challenge you to lead. We may never have this opportunity again.

Invitation. Everyone is welcome to Nova Scotia for the annual convention of the Council and the IMSI. I know this will be the greatest convention ever. The Nova Scotia Committee is doing a superb job in arranging and organizing this event. Plan now. Don't miss it. Nova Scotia welcomes us.

There is currently a feeling of harmony in our industry. I have never experienced the interna-

tional cooperation our industry is enjoying. I am elated at the participation each and every maple entity is providing (American and Canadian). With these cohesive elements present, the boundaries for achievement are removed. We are at the threshold for maple opportunities to be infinite. We need to grasp the moment. We need to pursue our most prestigious and elusive goals. We need to all shoulder our responsibilities and reach out a little further than we have ever done before. Together and united, we can attain the most illustrious potentials. Let us go out and tell the world, **MAPLE IS NUMBER ONE.** We can do it.

So, until we share a sunset from Nova Scotia, or until we watch another day close together, or until again we chat, my very best to all of you. Our friend-friend relationship is above all and is on-going. Good bye. Au revoir.

Lynn Reynolds  
Your President

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So you think they have gone away?  
**PEAR THRIPS, THE LITTLE ONE  
THAT CAUSES BIG PROBLEMS**

Bruce L. Parker, Margaret Skinner & Michael Brownbridge  
Entomology Research Laboratory  
University of Vermont  
Burlington, Vermont

Aerial survey results of forested lands in The State of Vermont have been completed by personnel of the Vermont Department of Forests and Parks. Brent Teillon, Chief of Forest Protection reports moderate to heavy damage of sugar maple trees occurred on 75,000 acres. Light damage was observed, but not recorded, on many more. In many sugarbushes defoliation was similar to what we observed in 1988.

This year's damage was predicted in early January, based on the number of overwintering thrips found in soil samples taken from 110 sugarbushes throughout the state. There is little doubt that pear thrips are still prevalent in our forests and that sugar maple trees are at risk.

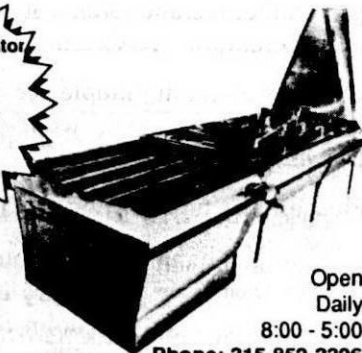
Many of the trees with moderate defoliation did not re-leaf and the damage caused by this tiny in-



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sect was still very evident. In July, at *Maplerama*, Lynn Reynolds, our President, couldn't believe the condition of some of the trees he saw in Vermont. He said, "I had no idea pear thrips could cause such serious damage". Although the immediate impact of thrips damage is not well defined sugarmakers were encouraged to get out into their stands and evaluate their trees. If sugar maples were found with significant damage managers were urged to consider reducing the number of taps used in 1994.

Vermont scientists continue to take a leadership role in developing management strategies for pear thrips. The insect killing fungus discovered in late 1989 has now been fully tested in the laboratory. It has great potential for practical use and recently it was formulated and tested in several sugarbushes in central Vermont. Although results are incomplete at this time, it looks promising. On recommendations from sugarmakers we are

taking a proactive approach and investigating the effect of these fungi on nontarget organisms. Details of these experiments will be reported in subsequent editions of the *Maple Syrup Digest*.

By the time this article reaches publication *The 1993 International Conference on Thysanoptera*, dealing in part with pear thrips, will be history. Vermont sugarmakers were instrumental in making it all happen. In attendance were over 200 participants from all over the world. Experts in thrips management came from 30 states in the U.S. and 27 different countries. Scientists, managers and growers came from as far as S. Africa, Australia, Taiwan, Philippines, Israel, Japan, Brazil, and many of the countries in Europe. It all helps to get a better understanding of how to manage these unique tiny insects that can cause such severe damage to sugar maples, as we have witnessed again in 1993.

## THANK YOU

Lloyd's family have been greatly comforted by all the thoughtful words in his memory — through the MAPLE SYRUP DIGEST and the many personal cards and letters. It was most gratifying to see so many friends at his memorial service in January.

We will be making maple syrup in some future year — it's in our blood! We have made many wonderful friends through our "Maple Syrup" travels and meetings.

Please don't forget where we live and do stop in for a visit.

Thank you from our hearts —

Mary Lou Sipple

John Sipple

Ellen S. Anderson

Barbara S. Baker

— and their families

## TREE TAPPING

Jorns' Sugarbush, Egg Harbor, hosted the First Tree Tapping Event and the annual Maple Cooking Contest this year. March 15 started out at 0°F and went up to 10°F for a high. With an east wind we did not have the best weather on record for the event.

Fifty people attended the festivities including two sugar bush inspectors and two state legislators.

Alice, In Dairyland, Kristan Conrad, was given a one inch ship's auger by Roland to tap the first tree. After the look of astonishment she and Wisconsin Maple Queen, Terri Holmes were given a power tapper to do the job of tapping the first trees.

Donna and her crew did an excellent job of serving a warm brunch featuring pure maple syrup. French Toast, sausage, sweet rolls and locally made apply/cherry juice was enjoyed by those in attendance.

Although the weather was cold the Event has hot. Thanks go to the Jorns for taking the time to host this promotional occasion.

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## INDIANA NEWS

By Dan Garner

The IMSA had a very successful run at the state fair this past month. We set up an old-time sugar camp at the Pioneer Museum run by the Purdue Agricultural Alumni Association. Out front we demonstrated the Native American method of making sugar using a hollow log and hot rocks. There was also an iron kettle hanging from a tripod, showing the earliest method employed by the pioneers. During the fair we gave out over 4000 free tastes of pure Indiana maple syrup to visitors to the fair. Many people had never tasted pure maple before, and were pleasantly surprised. This also helped us in our sales effort which raised over \$2400 for the association. Special thanks go to Maurie Williamson, who helped make this possible.

The annual meeting of the IMSA will be December 4, 1993 at Auburn Indiana, not Angola as stated in the last digest. The meeting place is at the Auburn catering facility on C.R. 36A. We would like to extend an invitation to any and all maple producers in the area (Michigan, Ohio and Ontario) to come to the meeting.

**THANKS** to those customers who have purchased all of our extra bulk maple syrup this Spring. To the others who have called, we're sorry we couldn't supply you this Summer. *Perhaps* you can call us before the 1994 season, so we can talk about reserving for you some of the next crop.

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# MAPLE SYRUP ADULTERATION DETECTION METHODS PART I

Nicholas H. Low

Department of Applied Microbiology and Food Science  
University of Saskatchewan  
Saskatoon, Saskatchewan, Canada

## Introduction

Adulteration of maple syrup is considered to be one of the most important problems currently facing the maple industry. This fraudulent practice if unchecked will ultimately cripple an extremely important industry.

Adulteration of foods is not a new problem. In the early 1800's unscrupulous tea traders would treat used tea leaves with black lead to "restore colour" in order to resell the leaves as "fresh." Similar situations occurred with foods which were of poor quality or spoiled. More recent examples include the addition of inexpensive sweeteners to fruit juices (apple, orange, grapefruit), beet invert and high fructose corn syrup adulteration of honey, and the adulteration of olive oil with the less expensive canola oil.

Although this subject is quite complex, it is hoped that the following discussion of adulteration and adulteration detection methods will help individuals in the maple syrup industry find their way through this "scientific maze".

The major soluble solid present in maple syrup is carbohydrate (~98% of the total soluble solids). The major carbohydrate present in 'fresh' maple syrup is sucrose with only trace levels (up to ~12%) of

glucose and fructose (Maple Sirup Producers Manual). Maple syrup which has aged (regardless of the container) contain higher levels of glucose and fructose (up to levels of 25%). This increase is mainly due to the action of microbes on the syrup.

Because of the high levels of carbohydrate in maple syrup, adulteration involves the replacement of "maple carbohydrates" with less expensive carbohydrates. A number of commercially produced inexpensive (\$0.34-\$0.40/lb) sweeteners are available for this replacement:

a) beet/cane sugar: this material is produced by the chemical refining of either sugar beet or sugar cane. The final product is ~100% sucrose (a disaccharide which is comprised of one molecule of glucose linked to one molecule of fructose);

b) beet/cane medium invert sugar: this material is produced from refined beet or cane sucrose by either acid or enzymatic hydrolysis and results in a finished product containing a 1:1:2 ratio of glucose:fructose:sucrose;

c) high fructose corn/potato syrup: this material is produced by the enzymatic hydrolysis of either corn or potato starch (polymer of glucose). The resulting glucose

syrup is partially (45% or 55%) converted to fructose enzymatically. The final product consists of 58% glucose and 42% fructose (high fructose syrup 42) or 45% glucose and 55% fructose (high fructose syrup 55).

A number of analytical methods have been established to detect the undeclared addition of inexpensive carbohydrates to pure foods. A brief explanation of each of these methods follows along with the limitations of each method.

### Carbohydrate Detection Methods

#### 1. Carbon stable isotope ratio analysis (SIRA)

This method is based on carbon dioxide (CO<sub>2</sub>) fixation mechanisms of plants. Higher plants (such as *Acer sacharum* Marsh.) fix CO<sub>2</sub> by the Calvin (C<sub>3</sub>) cycle, whereas corn/cane plants (sources of cane sugar and high fructose corn syrup [HFCS]) fix CO<sub>2</sub> by the Hatch-Slack (C<sub>4</sub>) cycle. These differences result in the <sup>13</sup>C/<sup>12</sup>C ratio of these materials being quite different. These differences can be measured by mass spectroscopic analysis of a

sample versus an internal standard (limestone). Pyrolysis (thermal decomposition of organic materials) of a pure maple syrup sample gives SIRA values (when compared to the standard) of -22.37 to -24.81 ppt (Carro et al., 1980) while SIRA values for cane sugar and HFCS range from -8 to -10 ppt (Bricout and Fontes, 1974). Therefore, the addition of either cane sugar or HFCS to maple syrup would result in a SIRA value of the adulterated sample being less negative than -22.37 ppt.

The SIRA method suffers from a number of limitations. Of greatest concern is the fact that this method is unable to detect the addition of any level of beet sucrose/beet medium invert sugar because these materials have SIRA values in the -24.0 to -26.0 range. Due to the wide natural SIRA range of pure maple syrup this method is only applicable when adulteration levels are greater than 15%. In addition, a new inexpensive sweetener produced from potato starch (high fructose potato syrup, HFPS)



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has a SIRA value similar to that of sugar beets, which obviates the use of this method for this possible adulterant.

## 2. Carbohydrate Content and Ratio Analysis

This method is based on the natural levels of glucose, fructose and sucrose in maple syrup samples. These three carbohydrates make up >99% of the total carbohydrate in pure maple syrup. Literature values for these three compounds show that combined glucose and fructose levels range from 0-12%, while those for sucrose range from 88-100%. Analytical results from our laboratory have shown that pure maple syrup which has been stored (in metal or plastic containers) for periods >1 year may have combined glucose and fructose levels up to 25%.

Unfortunately, this method is only useful for gross adulteration of maple syrup due to the wide natural range of glucose and fructose in maple syrup, particularly if the syrup has been stored (>1 year). This method is also unable to detect the addition of either cane or beet sucrose at any level.

## 3. Site Specific Natural Isotope Fractionation Nuclear Magnetic Resonance Spectroscopy (SNIF-NMR)

Although this method has not yet been applied to maple syrup, it has been used to detect the addition of beet sucrose/beet medium invert sugar to orange and grapefruit juice (hydrogen content of the carbohydrates present in a food sample. This is accomplished by distillation of the ethanol produced and analysis on a nuclear

magnetic resonance spectrometer. With respect to fruit juice it has been shown that the deuterium content of ethanol derived from beet sucrose is significantly lower than the ethanol derived from orange or grapefruit juice.

One of the major limitations of this method is cost. The equipment required to conduct this analysis costs more than \$400,000 and this results in individual sample costs of \$500 to \$600. This method also requires an extensive data base of pure samples from each producing region over a number of production years (to account for climatic variations). Detection limits for fruit juices approximate 15% if the geographical origin of the juice is known and 20%+ if unknown. Currently only one company (Eurofin, Nantes, France) is set up to analyze samples. Unfortunately very little published information on this technique, its limitations, data base results, etc. are available which severely limits the usefulness (and its' ability to stand up in court) of this method. In addition, this method can be "fooled" by the addition of equal quantities of cane sugar and beet sugar (ie. 10% addition of each material). The addition of these two adulterants offset their deuterium differences and result in 'normal' SNF-NMR values even though the product is adulterated at a level of 20%.

## Conductivity Measurements

Although no scientifically reviewed publication exist on the use of conductivity for maple syrup adulteration detection, this method is widely used in eastern Canada. The method is based on

the ability of a diluted maple syrup sample (approximately 25 °Brix) to conduct a current. Users of this analytical technique report that a conductivity reading <1200 microsiemens (1.2 millisiemens) "suggests the sample has glucose or granular sugar added". Samples which have low readings require further analysis by SIRA methodology.

All ions present in a maple syrup sample contribute to its' conductivity measurement. Because of the wide natural range of minerals, organic acids and other ions in pure maple syrup this method of adulteration detection is useful as a screening tool only.

#### 5. Oligosaccharide Analysis

This method is based on natural oligosaccharide (carbohydrates which contain from two to ten monomeric units) patterns in pure foods and in inexpensive sweeteners. Analysis of these oligosaccharides is accomplished by HPLC and capillary gas chromatography. Although these oligosaccharides make up only a fraction (0.1-0.001%) of the total carbohydrate content of foods they can be 'seen' by either pulsed amperometric or a flame ionization detectors.

The oligosaccharides present in a food can be used as a 'fingerprint' for that material. Therefore, when an inexpensive sweetener (such as beet medium invert sugar) is added to pure maple syrup, sample analysis reveals via 'fingerprint' oligosaccharides, the presence of this adulterant. This method has been successfully used to detect adulteration of citrus juices (Swallow and

Low, 1991) and honey (Swallow and Low, 1993). This method is currently being expanded to detect the addition of inexpensive sweeteners to maple syrup and results from these experiments will be presented in the next addition of the Maple Syrup Digest.

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# OHIO MAPLE PRODUCER'S FALL TOUR AND ANNUAL MEETING

By Tom Hoffman

The 1993 Ohio meeting and tour will be held in Northwestern Ohio November 5 and 6, with headquarters at the Findlay Inn, in Findlay, Ohio.

Registration will be Friday afternoon along with the trade show and a tour of one of only two companies in the country that build coal and mining cars. The annual dinner meeting and entertainment will be that evening.

Saturday will feature tours of

nearby sugarcamps, one that is a stand of virgin timber and another where meticulous record keeping results in higher production. Other stops include the University of Findlay Equestrian Farm with over 200 horses, a 257 head angora goat farm and an historic 67 year old ice cream manufacturer.

For more information on how to sign up for this year's tour or if you are interested in being part of the trade show please contact either of the following:

Dave Herring — 16303 TH 124,  
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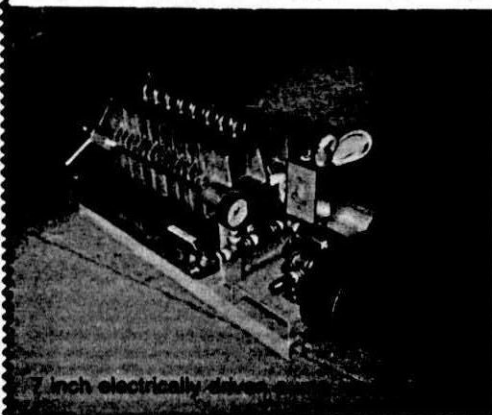
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## LEWIS J. STAATS HONORED

Lew Staats, manager of the Uihlein Sugar Maple Research—Extension Field Station of the Department of Natural Resources, Cornell University, is this year's recipient of the Charles R. Hubbell Memorial Award for significant contributions to the advancement of the state's maple industry.

The award was presented to Lew by Agriculture and Markets Commissioner Richard T. McGuire on 7 May at the opening ceremonies of the Annual New York State Maple Festival in Albany.

Lew has been with the Department of Natural Resources, sta-

tioned in Lake Placid, since the mid-1960's. He has been very active in the Cornell Maple Program in both research and extension. He worked closely with Professor Bob Morrow until Morrow's retirement in 1983. For the last 10 years he has been working with Professor John Kelley, the present director of the program.

Lew has the Master of Forest Resources degree from the SUNY College of Environmental Science and Forestry at Syracuse. Through his research and extension work he has gained a national and international reputation for excellence in the sugar maple field.

Congratulation Lew for receiving this well deserved honor.



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# THE AMERICAN MAPLE MUSEUM

By Fred Schneider

The 16th annual reopening of the American Maple Museum, May 8, saw ideal spring weather. Maple syrup equipment manufacturers and dealers displayed their wares on the Museum grounds and drew considerable interest.

A craft show, with twenty five booths, was set up on the front lawn and drew a large crowd. This was the first year for a craft show and due to its success, the committee is planning another one next May.

Breakfast was served to some 300 people who ate all the pancakes, sausage and pure maple syrup they wanted. The Museum gift shop reported an excellent day too, with sales of maple syrup, souvenirs and maple styled jewelry from Vermont. As this is an international museum, we try to find items from across the maple region for the gift shop.

Charles Bacon of Jaffrey Center, NH, was presented for induction into the American Maple Hall of Fame by Neil Wright of Camden, NY.

Mr. Wright has been in the maple syrup business for many years and markets his product under the "Little Chief" label. He has also been active in the Lewis country and the New York Maple Producers Associations.

Charles W. Bacon, Jr., was born in Jaffrey, NH, April 4, 1923. He entered a family that had been making maple syrup since the

1790's, and operated a country hotel and farm called the ARK.

Charles married Virginia Hunt in 1942 and raised three children. Following his mother's death, they took over management of THE ARK and made it a year around resort hotel. They still made maple syrup but discontinued the farming operation.

In 1969 Charles was appointed to a committee of the New Hampshire Maple Producers Association to investigate the use of plastic containers for maple syrup. After much research the Bacon plastic jug was developed and accepted by the industry.

By 1980, production had topped a million jugs and Charles took the family to Hawaii to celebrate — all 10 of them. The Bacon jugs are essentially unchanged from that first one produced in 1971, and have withstood the test of time.

Charles Bacon has been a member of the North American Maple Syrup Council and the International Maple Syrup Institute since the 1970's as well as the New Hampshire, Vermont and New York Maple Associations and still lives in the house where he was born.

He remains active in business, with the help of his daughter, Pat, son-in-law Jack, and son Jim, at Bacon's Sugar House in Jaffrey. Mr. Bacon became the 38th member of the American Maple Hall of Fame.

Mr. James Bocky of Somerset, PA, had also been selected by the NAMSC for induction into the Hall of Fame but was unable to attend because of ill health. Mr. Bocky will be formally installed next year.

Over the years some of the Hall



of Fame members have moved and we do not have current addresses for them or the families of those who are deceased. We would like to update our files and ask your help in doing this.

Miss Molly Young representing the Western New York Maple Producers was selected as New York State Maple Queen and will represent the industry during the coming year. Miss Jeannett Wolfe of Schoharie County was chosen as her alternate.

Each year, during the ceremonies, the MC takes an informal poll to learn where those in attendance are from. This year we found visitors from New Hampshire, Ohio, Massachusetts, Connecticut, Vermont and, of course, New York.

We missed our old friends, Lloyd and Marylou Sipple who have contributed much to this Museum. Also missing were Bob and Florence Lamb whose health severely limits their travelling. Things

aren't quite the same without them.

We are adding to our collection of sugar houses and if you have one you would like displayed, send it along with name and address of the owner and where it is located. We have a growing number of photos from across the maple region on display. Snap shots are fine. Send them to: The American Maple Museum, P.O. Box 81, Croghan, NY 13327.

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# COMPUTER MODEL SIMULATES TREE GROWTH

The toll of acid rain, drought and ozone pollution on trees now can be predicted with a dynamic computer model that simulates tree growth from the roots to the top of the canopy.

The ability to predict as much as 100 years ahead provides a powerful tool for management of natural resources, said David Weinstein, a research scientist at the independent Boyce Thompson Institute for Plant Research, located at Cornell University. As a result, the model is being used by the federal Environmental Protection Agency, the National Forest Service and the National Park Service, as well as universities and national laboratories.

The model, called TREGRO, has produced new insights into the role of environmental stresses on tree growth. For example, although one might expect that a tree in poor health because of inadequate nutrients would be especially susceptible to ozone damage, TREGRO predicted the opposite because such a tree would take in less ozone than normal, Weinstein said.

In a significant confirmation of the model's validity, Weinstein and John Lawrence, also a research scientist and program director of environmental biology at Boyce Thompson, examined the effect of severe defoliation of red spruce trees, an event occasionally produced by bitter winter cold. TREGRO predicted a 41 percent re-

duction in growth, by volume, in the first three years after a 50 percent defoliation. The prediction concurs well with field observations of a 32-percent reduction in growth over a three-year period following a 40 percent defoliation, he said.

"We're using the model to evaluate potential reductions in growth within five major forest types around the United States," he said. These range from the sugar maples and red oaks common in eastern forests to the northwestern ponderosa pine and white fir forests.

In addition to stress such as pollution and drought, the researchers are assessing the effects of global warming on the giant sequoia forests in the West. They want to learn, for instance, whether lowland species will migrate to higher altitudes and displace sequoia if the average temperature rises.

Used in conjunction with a computer model of forest growth, TREGRO revealed that a predicted decline of ponderosa pine under ozone stress was delayed in a mixed stand with white fir. The reason: Stressed ponderosa pines grew more slowly, but for a period of about 20 years they gain a competitive advantage over white fir, injured more severely by ozone—although the advantage disappears with time.

The model is being used to examine questions where experiments are difficult or impossible to perform. For instance, in a collaboration with researchers at Carnegie-Mellon University, Weinstein showed with the model that the

susceptibility of red spruce to ozone damage depends more than anything else on the rate of root growth—an area where experimental data is in short supply.

Weinstein and a team of Boyce Thompson scientists developed TREGRO during the past six years as a general program capable of predicting tree growth for a wide variety of species, ranging from maple saplings to towering firs. Based on field experiments, TREGRO simulates the mechanisms by which plants regulate their carbon,

water and nutrient cycles to mitigate damage from stress.

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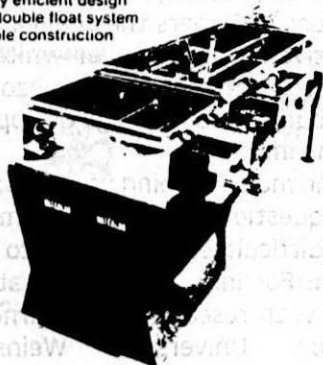
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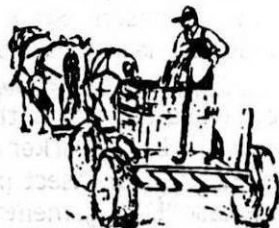
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## 28TH VERMONT MAPLERAMA HELD

By Ray Foulds

The 28th Vermont Maplerama was held in Lamoille county at Johnson State College on July 29-31, 1993. It consisted of exhibits and a banquet held at Johnson State College; also visits via bus to sugar bushes and a sales outlet in other parts of the County. Approximately 270 persons attended, with approximately 250 at the banquet.

As in 1966, the first year of the Maplerama, the objective was to acquaint sugar maker with the best and most up-to-date methods for sugar bush management and the making and sales of maple products. At first only Vermonters were invited. However, more recently sugar makers from other States and Canadian Provinces took part; as well as manufacturers of modern equipment and packaging.

As the Maplerama began on Thursday night there was registration and the setting up of exhibits at the "Shape Center" Gym. There was also a hors d'oeuvres buffet. On Friday morning there was a bus tour to the Proctor Maple Research Center in Underhill; as well as concurrent workshops at Bentley Hall on the Johnson State College campus. At the Proctor Mample Research Center the various groups visited research areas in the woods used by Dr. Bruce Parker and Margaret Skinner for insect problems, with a talk "Management of Insect Problems in Sugar Maples"; a maple fertilization study by Tim

Wilmot and Phil Brett; also a test site for acid rain. The present lab building (new after the fire four years ago) was shown, also a new sugar house. Pear thrips was discussed. (Damage on leaves is heavy here. There is a test site in the Randolph area.) It was noted that the Proctor Maple Research Center was begun in 1946 with funds donated by the then Governor Mortimer L. Proctor. Dr. James Marvin, assisted by Dr. Fred Taylor, arranged for purchase of the 200-acre parcel (formerly the Harvey farm).

Lunch was enjoyed at Stearns Hall in Johnson. Speakers afterward at Bentley Hall included Randy Heiligmann, Extension Specialist in Forestry from Ohio State University, who spoke on, "How to Destroy Maple Syrup: Important Factors and Practices Affecting Maple Syrup Quality"; Gregory Passewitz, Extension Small Business Specialist from Ohio State University, who spoke on, "Back to Basics, Marketing Maple Syrup"; Erv Fagerson, Emeritus Professor from U. of Mass., Amherst, Mass., who spoke on "Sap and Syrup Chemistry — Its Effects on Flavor and Color"; Andre Morin of Quebec, speaking on "Maple Marketing"; Rich Chipman, who spoke on "Wildlife Management in the Sugar Bush"; and Sandy Wilmot, who spoke on "Forest Health Monitoring."

In addition to the regular talks at Bentley Hall there were separate classes on candy making. These were conducted by Carolyn Perley of Richford, Cora Smith of Richford, Cathy Messier of Barton, and Ann Rose of Ludlow.



Approximately 250 persons attended the banquet. Master of Ceremonies was Orleans County For-ester George Buzzell from Newport. Chairman was Bill Wildes. The Maplerama Committee included Bill Wildes, George Babcock, Moe Wildes, Mac and Dot Joslyn, Howard Duchacek, Rene and Myrtle Savoie, Audrey and Lew Coty, David Marvin, Eric Aither, Michael Boudreau, Ed and Margaret Bliss, Bob and Carolyn Jones, Paul Frederick, Henry Markres, and George Cook. Buzzell introduced as a speaker George Dunsmore, Commissioner of Agriculture; David S. Barrington, head of the Botany Dept., UVM, in Burlington; Bill Clark, Pres. of the U.M.S.M.A.; and Members of the Maplerama Committee. Others assisting were Linda Scharrenberg, UVM Extension Secretary; also Ron Wells, Brad Greenough, Michelle Welch, and Freda Burnor of the Vt. Dept. of Forests, Parks, & Recreation. The Ray Foulds Award was presented to Michael P. Boudreau of Elmore. (He made 1,050 gallons of syrup from 5,500 taps). Runner-Up was Warren Whitcomb III of Eden.

During the third day program (Saturday) seven buses took partic-

ipants to different tour stops. These included the Johnson Woolen Mills, Butternut Mt. Farm Store in Johnson village; the Butternut Mt. Farm Sugaring plant in Johnson; Lande's Sugarhouse in Johnson (Janeric Products); Rene and Myrtle Savoie's "Wildbrook" sugar house in Johnson; Whitcomb's sugarhouse in Eden; Buttolph's sugarhouse in Belvidere (28,000 taps); and Duchacek's sugar house in Waterville (2,000 taps).

It was noted that this is the 100th year since the organization of the Vermont Maple Sugar Makers' Association on January 12, 1893 in Morrisville. A three-page historical summary, from a history by Fred Taylor, was printed in the Maplerama Program Booklet. The V.M.S.M.A. now has over 700 members and is active in many activities, such as the Vermont Farm Show and the Eastern States Exposition, which help the maple industry. Plans are under way to continue activities and improve them wherever possible. A special 1994 Calendar with maple pictures has been printed and is being sold to commemorate the anniversary.

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# OHIO STATE FAIR

The 140th Ohio State Fair completed its seventeen day run on August 22, 1993. The Ohio Maple Producer's Association provided personnel to work each day in the sugarhouse constructed in the Agriculture and Horticulture building. Inside the sugarhouse were housed the competition syrups, candies, informative displays and equipment used in producing maple syrup. New this year was an area with benches where visitors could view a video tape on maple production, and a display showing how little, if any, maple is in table syrups found on grocer's shelves. Many visitors were surprised to learn that they have not been getting real, pure maple syrup. This points out how important it is to educate today's consumer if we are to sell our product.

The results of the syrup competition are as follows:

## *Grade A*

### *Pure Maple Syrup*

#### Light Amber

1. Thomas Hoffman, Bath
2. Maple Lane Farm, Mt. Gilead
3. William Brown, Fredericktown
4. Goodell Farms, Mantua
5. Hans Geiss, Burton
6. Hilton Farley, Middlefield
7. Charles Keiter, Xenia

#### Medium Amber

1. Thomas Hoffman, Bath
2. Rhodes Sisters, Huntsburg
3. William Brown, Fredericktown
4. Richard's Maple Products, Chardon
5. Maple Lane Farm, Mt. Gilead
6. Charles Keiter, Xenia

#### Dark Amber

1. Thomas Hoffman, Bath
2. William Brown, Fredericktown
3. Charles Keiter, Xenia
4. Richard's Maple Products, Chardon

### *Novice Class Grade A Pure Maple Syrup*

1. Larry Wolf, Southington

A plaque for the highest total points in all classes of syrup and confections (one pound bricks, stirred sugar, maple cream, small sugar cakes, maple icing, and novel design) was presented to: Charles Keiter, Xenia, Ohio.



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## MARKETING TIPS

### Dark Side of Consignment Selling

By David Kopp

For some producers consignment of products to stores has worked well and proven profitable. However some negatives appear in this method of sale especially when businesses grow.

1. Increased bookkeeping.
2. Products get "tied up" not sold, this can hurt cash flow.
3. Lack of concern on store-keepers part for products they do not own. Many times resulting in poor display location, perhaps left to fade in sunny windows or becoming shop worn or mishandled.

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lent maple syrup from organically grown trees.

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# NEWS FROM CONNECTICUT

By Jerry Milne

Connecticut's sugaring season was unusually short this year as cold weather caused the sap to run about 3 weeks behind normal, resulting in a 20% decrease in syrup production. The so-called "Blizzard of the Century" in mid-March added to sugarmakers woes, although it was a good year for sugar on snow parties!

The Connecticut Maple Syrup

Producers Association will hold their fall meeting on November 6, 1993 at the Firemen's Clubhouse in Simsbury. The meeting will include tours of local sugarhouses. Plans have also been made for the spring meeting to be held in January at the University of Connecticut in Storrs. A demonstration of how to install a tubing system will be the main feature of the event.

## DEADLINE FOR DECEMBER ISSUE IS NOVEMBER 1

It's been 19 years since some producers in Rutland County VT decided to find a manufacturer who would help produce sap tubing and fittings to work better for them than what was available. The results became known as Berliner tubing and Berliner fittings. Last Winter, these fittings became renamed Beaver River fittings; and due to producer requests this special-formula sap tubing is also being made.

The fittings all have 3 barbs on each nipple (to hold the tubing better) and are made of a special formula Dupont nylon (to better resist snapping in the cold), and have larger openings than in any other brands we've seen (for faster sap flow). Beaver River spouts have a clip, to speed up the tapping in the Springtime. (Instead of needing 2 hands to pull the spout off the plug on the tee fitting, use only one hand to unclip the spout from the lateral line.)

For those who want encouragement, we'll have a REINTRODUCTORY SPECIAL on the spouts -- 20¢ instead of the usual 26¢ -- until Xmas.

The 5/16 inch green tubing is being made again, using the "Old Berliner Family Recipe." This material is designed to stretch a bit when put up in the cold, to minimize sags later on when it's warm. This special formula produces an extra-smooth wall, for less drag on the flowing sap. Unlike some Canadian tubing, we use NO REGROUND material, which would give an uneven sidewall. Sidewall thickness is now more than it was before. Retail prices on 500-foot rolls are Standard Smooth-wall \$41.00; and Six-Ribbed \$43.00.

Available from the Rutland County Maple Producers Assn; also at Danforth's (East Montpelier VT); Shinholt's (Corriganville MD); and from the owner Warren Allen (R.D., Castorland NY 13620; 315-346-6706)

For samples of Beaver River tubing and/or fittings, send \$1.00 to W. Allen. Six more dealerships available, including to other producer associations. All of our fittings and tubing made in the U.S.A.

## MAPLE FIELD SEMINAR ANNOUNCED

In cooperation with Uihlein Sugar Maple Field Station of the Cornell University Department of Natural Resources in Lake Placid, Paul Smith's College Forestry Division announces a seminar to be held on October 9, 1993. The morning session will be spent at the Paul Smith's College Sugarbush with focus on the wood chip gasification

unit, tubing in the bush and rodent damage control. Following a buffet lunch at Paul Smith's the seminar will continue to Lake Placid for a session focusing on the management of a sugarbush for maximum sap production while maintaining tree health, the proper sap collection system installation and maintenance, including road systems. To register for the seminar, please call Paul Smith's College Conference Services at 518-327-6249.



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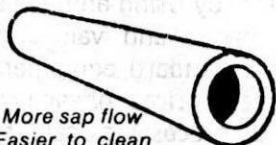
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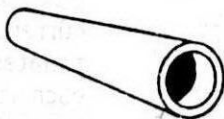
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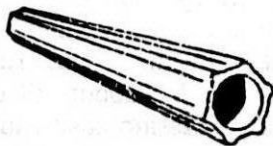
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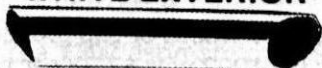
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# MAPLE SYRUP PRODUCTION COST UPDATE FOR 1992

By Neil K. Huyler  
and Sumner Williams

The cost to produce a gallon of maple syrup in 1992 was \$19.88. If the price of fuel oil remains stable, and there is every indication at this time that it will, production costs in 1993 should increase with an inflation rate of about 4 percent (Council of Economic Advisers 1984-92). In 1992, fuel oil accounted for about 25 percent of the processing cost and about 14 percent of the total cost of production (including woods and processing costs), confirming that energy remains one of the major cost items in producing maple syrup.

In 1992, maple syrup prices dropped by about 10 percent, while production increased by about 28 percent over the 1991 season. An average production year in 1993 combined with the apparent surplus of 1992 syrup, especially in Canada, probably would cause the retail price to drop even more.

Sendak and Bennink (1985) developed an annual maple syrup production-cost series for 1972 to 1984. The series assumed a 3,000-tap plastic tubing with vacuum system and an oil-fired open-pan evaporator. The report showed that production costs increased more than 2.5 times, from \$6.16 per gallon in 1972 to \$15.93 per gallon in 1984, or 7.9 percent per year. During the same period, the price of maple syrup at the farm

nearly doubled, increasing at an annual rate of 5.9 percent.

We used the same assumptions and methods and similar sources for price information to estimate the 1992 cost of syrup production. In reviewing the assumptions and methods used, a plastic tubing system with vacuum was used for sap production for a 3,000-tap operation. Syrup processing was estimated for both oil-fired and wood-fired evaporators. The relationship between physical inputs and outputs was defined and converted to current dollars by using annual estimates of prices and values of each item. A standard equipment list and source of prices for sap production and processing can be found in Sendak and Bennink (1985).

The 1992 annual operating cost per gallon of syrup was \$19.88 for an oil-fired evaporator and \$19.62 for a wood-fired evaporator (Table 1). Table 1 also includes a breakdown of the annual production costs by tap and by gallon of syrup for 2,000 and 4,000 taps by fuel type. The woods or sap-production cost for 1992 was \$2.73 per tap or about 45 percent of the \$6.21 per tap total cost of production for a 3,000-tap bush (Table 2). The remaining 55 percent, or \$3.48 per tap, was the cost of processing sap to syrup (Table 1). At the 1992 average farm price of \$22.30 per gallon of syrup as reported by the New England Crop Reporting Service for Vermont, the profit margin was \$2.42 per gallon (USDA Natl. Agric. Stat. Rep. Serv. 1977).

A comparison of the 1984 production-cost estimate of \$15.93

**Table 1. Annual processing and total production costs per tap and gallon of syrup, by size and fuel type, 1992**

	Annual costs per tap					
	2,000 Taps		3,000 Taps		4,000 Taps	
	Wood fired	Oil fired	Wood fired	Oil fired	Wood fired	Oil fired
-----Dollars-----						
Processing operation						
Sugarhouse	.29	.25	.23	.19	.19	.15
Evaporator	.87	1.03	.67	.80	.60	.73
Tax and Insurance	.06	.05	.05	.04	.04	.03
Labor	.59	.55	.39	.37	.30	.27
Fuel	.85	.85	.85	.85	.85	.85
Miscellaneous	.37	.39	.30	.32	.26	.28
Packaging	.92	.92	.92	.92	.92	.92
<b>Total operation</b>	<b>3.94</b>	<b>4.04</b>	<b>3.40</b>	<b>3.48</b>	<b>3.15</b>	<b>3.24</b>
Production cost						
Per tap	6.87 <sup>a</sup>	6.98 <sup>a</sup>	6.13 <sup>b</sup>	6.21 <sup>b</sup>	5.77 <sup>c</sup>	5.86 <sup>c</sup>
Per gallon syrup	21.98	22.33	19.62	19.88	18.48	18.76
Annual income						
Retail syrup price	22.30	22.30	22.30	22.30	22.30	22.30
Production cost	21.98	22.33	19.62	19.88	18.48	18.76
<b>Net return (gallon)</b>	<b>.32</b>	<b>-.03</b>	<b>2.68</b>	<b>2.42</b>	<b>3.82</b>	<b>3.54</b>
Capital investment						
Woods operation	13,611.95	13,611.95	19,227.71	19,227.71	28,843.48	24,843.48
Processing	15,888.57	17,255.67	18,625.47	20,052.07	21,533.52	23,444.62
<b>Total investment</b>	<b>29,500.52</b>	<b>30,867.62</b>	<b>37,853.18</b>	<b>39,279.78</b>	<b>46,377.00</b>	<b>48,288.10</b>

<sup>a</sup>Includes woods operation cost of \$2.93.

<sup>b</sup>Includes woods operation cost of \$2.73.

<sup>c</sup>Includes woods operation cost of \$2.63.

with the 1992 estimate of \$19.88 shows a 25-percent increase in the cost of production in this 8-year period, or about 2.8 percent per year. Maple syrup prices typically change with the amount of syrup produced in a given year. From 1984 to 1992, the price per gallon of syrup increased by an average of 3.3 percent per year (from \$17.20 to \$22.30 per gallon). This indicates that the profit margin remained the same, and it is realistic to believe that the profit margin for 1993 will be similar, given an average sugaring season.

The results of a sensitivity analysis by Sendak (1985) indicated that fuel oil and labor costs had the greatest influence on total production cost. A 50 percent increase in the cost of No. 2 fuel oil results in a 14-percent increase in the cost of producing a gallon of syrup; the same percentage increase in labor costs results in a 10-percent increase in the per-gallon cost. In 1992, production costs remained sensitive to these two variables, which helps explain the much smaller annual increase of 2.8 percent in the cost estimates for 1984

**Table 2. Annual woods production cost per tap, 1992**

Woods operation	Number of taps		
	2,000 taps	3,000 taps	4,000 taps
	-----Dollars-----		
Equipment	1.48	1.29	1.20
Labor	1.08	1.08	1.08
Materials	.27	.26	.25
Tax	.10	.10	.10
Total	2.93	2.73	2.63

to 1992 compared to estimates of 7.9 percent for 1972 to 1984. Looking at the trend in prices for No. 2 fuel oil over the past 8 years, we find that the price decreased. In 1984, producers paid an average price of \$1.24 per gallon of fuel oil. By contrast, the average price in 1992 was just under \$1 per gallon, a decrease of nearly 3 percent per year.

Another factor that has changed from 1984 to 1992 is the ratio of woods or sap-collection cost to the sugarhouse or processing cost. In 1984, 34 percent of the total cost was attributable to the woods cost and 66 percent to processing cost. In 1992, 45 percent of the total cost was attributable to the woods operation and 55 percent to the processing operation (Table 1). Again, this was most likely caused by the decrease in the cost of No. 2 fuel oil over the 8-year period while the cost of sap-collecting equipment was increasing at the low average inflationary rate of 3.8 percent per year.

To estimate syrup production cost for 1993, add the annual inflation rate of about 4 percent to the 1992 costs reported here. A close approximation of the 1993 cost of

production would be \$19.88 x 1.04 or \$20.68 per gallon.

In summary, the average increase in syrup production costs over the past 8 years (1984 to 1992) was 2.8 percent per year compared to 7.9 percent per year from 1972 to 1984. The retail price of maple syrup over the 8-year period increased by about 3.3 percent per year, which was less than the annual rate of 5.9 percent for 1972-84. If production is average for the 1993 sugar season, the outlook for maple producers is optimistic.

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#### *About the Authors*

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## IN MEMORIAM

HILTON A. FARLEY

Hilton A. Farley, president of The Ohio Maple Producer's Association, passed away on August 22, in the farm house where he was born 75 years ago, in Parkman, Ohio.

Hilton and his wife, Evelyn, were the third generation of Farleys to make syrup on their farm. In addition to being one of the founders of the Ohio Maple Producer's Association and current President, Hilton was a member of the International Maple Syrup Institute, Associate member of The North American Maple Syrup Council, former president of the Geauga County Farm Bureau, and a member of the Ohio Agricultural Research and Development Center support council. He held a commercial pilot's license and was an air traffic controller for 43 years. He served in the Pacific with the Navy in World War II.

He was an elder of Trinity Lutheran Church in Warren and served on the board of directors of Concordia Publishing House.

Though in failing health, Hilton still traveled to the Ohio State Fair this summer to help set up the Ohio Maple Producer's Display and enter the syrup competition.

Hilton was a tireless promoter of maple and his wisdom and guidance will be missed.

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**WANTED:** Sugar bush, 5000 plus taps. Joel Hoffman, RD 2, Box 310, Wellsville, NY 14895.

## VIDEO RELEASED

An educational video entitled "Maple Sap production; From Tree to Collection Tank" has recently been completed by Cornell University. The 30 minute video covers tapping, tubing system installation and maintenance, vacuum pumping, and other aspects of sap collection.

The video was produced at Cornell University's Uihlein Sugar Maple Research-Extension Field Station at Lake Placid, New York by John W. Kelley and Lewis J. Staats in cooperation with technical staff of Paul Smith's College.

This video tape may be obtained for \$30.00, postage paid, from:

Dr. John W. Kelley  
122C Fernow Hall  
Department of Natural  
Resources  
Cornell University  
Ithaca, NY 14853  
Phone: (607) 255-2110

Checks or money orders should be made payable to Cornell University.

Cornell's educational video "Sugarbush Management; A Guide to Improved Sap Production" is also available for \$20.00 by writing to the above address.

## REMINDER

### Research Proposal Guidelines

Research projects may be submitted for consideration based on the following guidelines:

(1) Proposals must be received no later than July 1, 1993 for consideration in 1993. Proposals received after that date will be considered in 1994.

(2) Proposals shall be complete and detailed in content. However, proposals shall contain a short concise cover statement briefly explaining cost, scope, objective, procedure, and anticipated value to the maple industry.

(3) Proposals shall contain detailed estimated cost breakdown, within the detailed report.

(4) Proposals shall be submitted with a minimum of forty (40) complete copies.

(5) Proposals must contain a complete reference section listing and explaining any similar or duplicating research previously accomplished. Proposals for duplication of previously completed research must contain detailed explanations of why such duplication is warranted.

(6) Results or progress of funded projects must be presented annually at the convention of the NAMSC and must be published in the Maple Syrup Digest as soon as possible after completion.

(7) Send proposals to: Lynn H. Reynolds, Research Committee, North American Maple Syrup Council, W10010 Givens Road, Hortonville, WI 54944.

Remember: July 1 Deadline.



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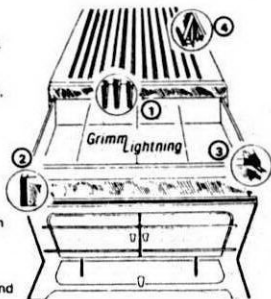
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