

NATIONAL MAPLE SYRUP DIGEST NATIONAL

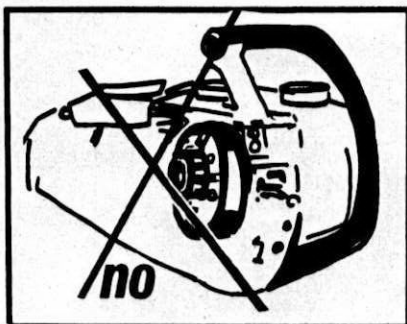
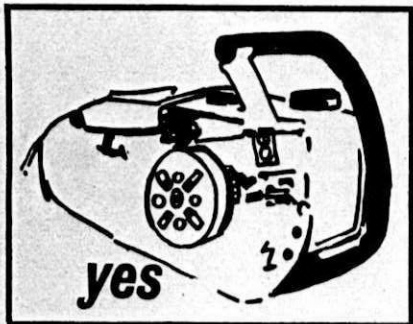


Vol. 16, No. 1

February 1977

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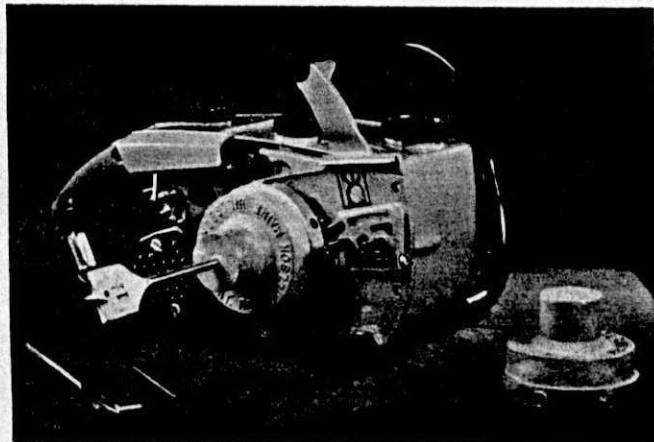
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NATIONAL MAPLE SYRUP DIGEST

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COVER PICTURE

New IMSI logo.
See IMSI news in this issue.

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Editorial

It's January already! A new year is here and am I glad of it.

Last year sure was a lousy one, here at least. Most of the northeast had 70° weather in February. It kept on in March and ended the maple season most places before April. It started the buds on Christmas trees, especially Doug Fir and some spruces. Then late frosts in April got them. A year's growth gone and a crop failure for Doug Fir seedlings at the nurseries.

A wet spring hampered planting corn. Some was good—some terrible. The wet weather grew a big hay crop but the only place you could put it was in a silo. Then it stayed so wet all summer about half the second and third crops weren't even cut. It slowed the corn crop's growth so the September frosts got some of it. What matured had to wait for the ground to freeze before it could be picked. Many garden crops were blighted and the fruit crop was very short, some places a complete failure. And while we were knee deep in mud in the east, some of the mid-west (especially Minnesota) was so dry everything threatened to burn.

But early winter promised a change for the better. We thought the wet ground might bother getting out Christmas trees but it froze when December approached and snow came early. We were in luck. The cold weather would keep the spruce fresh and hold the needles on. Don't kid yourself. It was so cold and raw, the needles were crisp and the buyers complained about needle drop on trees that were only cut three days before delivery. They had to soak some loads with a fire hose be-

fore they dared unload them. Now do you see why I'm glad to start a new year?

One bright spot was the Digest financial standing—we ended the year in the black. Now I'm asking you to please help me to keep it that way. Use the return envelope in the center fold of this issue to send in your contribution. This is the only time I'll ask you for money this year, so do it right now and you'll have a good feeling all year. If you don't want the Digest, please ask to have your name removed. If it isn't worth a couple of bucks a year to you, we better forget it.

There's one change necessary this year. The good old Postal Service has decreed that they should charge us about 35 cents each to use a first class return permit. This is for the same service a 13-cent stamp will buy except I have to pick them up at the post office. I believe it's because it takes them so long to get them back here they have to charge for storage! So - we'll have to forget the permit and ask you to put a stamp on it.

So long for now, and I hope you all have as good a season as I've been looking for the past 12 years.

OOPS!!

Somewhere along the line between this office and the Vermont Maple Sugar Makers Assoc. an error was made in compiling the list of Vermont readers who wished to continue receiving the Digest. About 125 names were omitted.

This has now been corrected. The names are entered in the mailing list and all those folks have been sent the October and December issues they missed.

WOMEN'S PAGE —

THE BOSS sez: it has been suggested we have a page - or a column, of interest to the women. We could have recipes using maple syrup or sugar, or just articles.

We've had "Women's Pages" before, but the contributions just didn't come in. The N.A.M.S.C. has asked to have a Women's Page again. I do not intend to write one every issue; we would like articles and recipes sent in by you women readers.

Please remember, though, that they must be short. Keep in mind that 1 typed page, 8 1/2 x 11, double spaced, will fill one column in the Digest. We can usually have 2 columns (1 page) although there may be times when there will be room for only 1 column.

Any articles longer than 2 typed pages will not be used. I have no inclination to "chop" or edit someone's writing!

For starters, I have 'stolen' (from an early Extension Bulletin) a recipe for

Maple Nut Cake—with an addition of my own:*

MAPLE NUT CAKE

2 1/4 cups flour 1/2 cup milk
1/2 cup sugar 1 cup maple syrup
3 tsp baking powder 2 eggs
1 tsp. salt 1/2 cup chopped nuts
1/2 cup shortening

sift dry ingredients into bowl, add shortening, milk and 1/4 cup maple syrup. Beat 2 minutes. Add remaining maple syrup and the eggs, beating 2 more minutes. Blend in the nuts. Pour into greased pan (9x13x2), bake 350° for 35—40 minutes. *When done, grate maple sugar over top and set under broiler for a 'minute or two' - or frost with maple syrup frosting.

—"Hiz Wife"

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IMSI NEWS

WINNERS OF THE INTERNATIONAL MAPLE SYRUP INSTITUTE LOGO CONTEST

The newly formed International Maple Syrup Institute, which held its first meeting recently at Hotel Syracuse, disclosed today its new logo which will identify pure maple syrup wherever it is sold in the world.

The logo represents half of a maple leaf, a sap bucket and a drop of sap from a spigot, recalling the natural source of the product. This design has been selected after a successful contest which drew over three thousand entries from the United States and Canada. The winning entry was submitted by Mr. Brewes Scholes of Willowdale, Ontario, who sweetened his Christmas with a \$1,000 cash prize awarded in the contest.

This logo will be used as a quality check on pure maple syrup products starting in the early spring of 1977. Use of the logo will be restricted to members of the International Maple Syrup Institute who will pay a minimal royalty for its use. The royalty will be used to fund a promotional campaign throughout North America.

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| | Mr. George Jahn,
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| | Mr. Doug Cleminshaw,
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up prizes
(\$100) | Mr. Denis Dube,
Outremont, Que. |
| | Mr. Bob Torrans,
Toronto, Ont. |
| | Ms. Joan Wheeler,
Mason, Mich. |
| | Mr. Gilles Lavigueur,
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SAP PRICES

Each year, in the February issue, we publish a chart of the sap prices paid by one New York Producer for the past two years and the proposed price to be paid in the coming season along with the respective retail and wholesale price of syrup in consumer packages.

This year this producer does not foresee any significant increase in sap prices since the major increase in cost of production is in the syrup processing end (fuel, containers, etc.)

Year	1975	1976-'77
Retail	12.00	13.50
Wholesale	9.00	10.25
Sap Brix	per gal.	per gal.
1.5	.029	.028
1.6	.039	.039
1.7	.049	.050
1.8	.058	.061
1.9	.066	.071
2.0	.073	.080
2.1	.079	.088
2.2	.085	.095
2.3	.091	.102
2.4	.097	.108
2.5	.102	.114
2.6	.107	.120
2.7	.112	.126
2.8	.117	.132
2.9	.122	.138
3.0	.127	.144
3.1	.132	.150
3.2	.137	.156
3.3	.142	.162
3.4	.147	.168
3.5	.152	.174
3.6	.157	.180
3.7	.162	.185
3.8	.167	.191
3.9	.172	.196
4.0	.177	.202

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COMMENTS ON THE MINNESOTA NAMSC CONFERENCE

by Rex Alwin, Chairman

The Minnesota Maple Syrup Producer's Association and the Minnesota Department of Agriculture wish to express their gratitude for the interest and effort that you of the NAMSC and IMSI undertook to help make this a very successful meeting. To get that many people (130) this far West is a real indication of the dedication of the membership of both organizations.

It gave our people in Minnesota a chance to "HobNob" with those from the East who they normally never see, and it gave the Easterners a chance to see the Minnesota northwoods with all its splendor including "smoke and drought". We were thankful that you folks brought with you a day of rain to slow down the fire danger in the area.

We also thank Marvin Smith (Extension Forester) and Dick Trestven (Agricultural Marketing Specialist) for helping produce this event.

Several items of the Minnesota conference were covered in the editorial for the December Digest. However, since the minutes of the meeting were not available at that time, I would like to briefly cover the conference

both administratively and technically.

The NAMSC wishes to express sincere thanks to those of you who participated in the technical sessions. The response was overwhelmingly favorable and very gratifying. The participation of the International Maple Syrup Institute was brief, but appreciated. Possibly in the future, the NAMSC and the Institute might conduct joint meetings as the technical sessions and much of the business session overlap.

Of prime interest to both organizations was the identity of each and, to define the areas of responsibilities for the NAMSC and the IMSI, these were outlined as follows:

IMSI: shall be devoted to promotion, research and standardization of maple syrup products.

NAMSC: is the legislative branch of the industry which represents the small producer as well as all others. Its functions are primarily academic and are to draw all facets of the industry together for the benefit of the producer, and, ultimately, the consumer.

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—photo by Dick Tretsven

Russ Davenport, Massachusetts, congratulates Maynard Speece, Farm Service Director for WCCO Radio, and speaker for the NAMSC annual banquet.

The new maple museum in Lewis County, New York was discussed. A committee was appointed to study its objectives and possibly establish it as our National Museum.

A long discussion concerning current maple research at the USDA Lab in Philadelphia culminated in the formation of a committee to seek continued research by this facility. This laboratory maintains equipment and highly skilled personnel in the fields of bacteriology and bio-chemistry.

In the technical session, Fran Lightly, Manager of Engineering of Osmonics, Inc. spoke on "Reverse Osmosis in the Sugar Bush." Henry Stephan of the Universal Milk- ing Machines Division spoke on the "Appli- cation of Vacuum Technology to the Sugar Bush." Howard Duchacek, University of Vermont, told of the work at the Proctor

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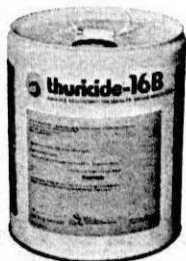
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Research Farm concerning pre-heaters, variations in pan design and fueling evaporators with wood chips. Dr. Claude Hills of the USDA Maple Lab in Philadelphia spoke on "Ion Exchange Reclamation of Buddy Syrup." Dr. James Marvin gave a "Review of Research at the University of Vermont." Lawrence Garrett, Northeast Forest Exper. Sta., spoke on "New Program Research in Maple Marketing and Economics." William

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Gabriel, Geneticist, NEFES, presented a review of "Genetics Research on a Superior Maple Genotype." Russ Walters, NEFES, gave an updated view of sap collection and silviculture research at the George Aiken Sugar Maple Lab. The following priority topics brought into discussion were objective and not conclusive:

- Rodent damage to maple equipment, particularly tubing. It was suggested that people with rodent problems and/or solutions for those problems, write a paragraph to the Digest editor to be published.
- The subject of maple tree diseases. The Vermont Maple Industry Council will have a meeting about new and different diseases that have appeared.
- Sugar house inspection was discussed briefly. We urge our own industry to use a checklist of standards of our own making.
- The supply of tin and glass containers was reviewed by Adin Reynolds who spoke of the availability of cans. Will Clark told of a new can company in Vermont that will make only syrup cans.
- Methods of cleaning tubing were discussed and referred to the Committee.
- The Digest format was brought up. The consensus of the members is to keep the Digest as it is, with the suggestion that an index of all articles be published.

Adin Reynolds, president of the IMSI, gave a history of the formation of the organization, also its aims and goals. Mr. Claude Tardif, executive manager of the IMSI reported on the accomplishments to date including a total budget for \$1,128,000 for the next 5 years.

Income - industry members	\$ 445,000
Prov. of Quebec	283,000
Canadian Government	250,000
USDA	150,000
	<hr/>
	\$1,128,000
Expenses, Marketing	\$ 750,000
Research	183,000
Administration	195,000
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	\$1,128,000

The next meeting of the North American Maple Syrup Council will be held at the Eastland Motor Hotel in Portland, Maine on October 17, 18 and 19, 1977. See you all in Portland!



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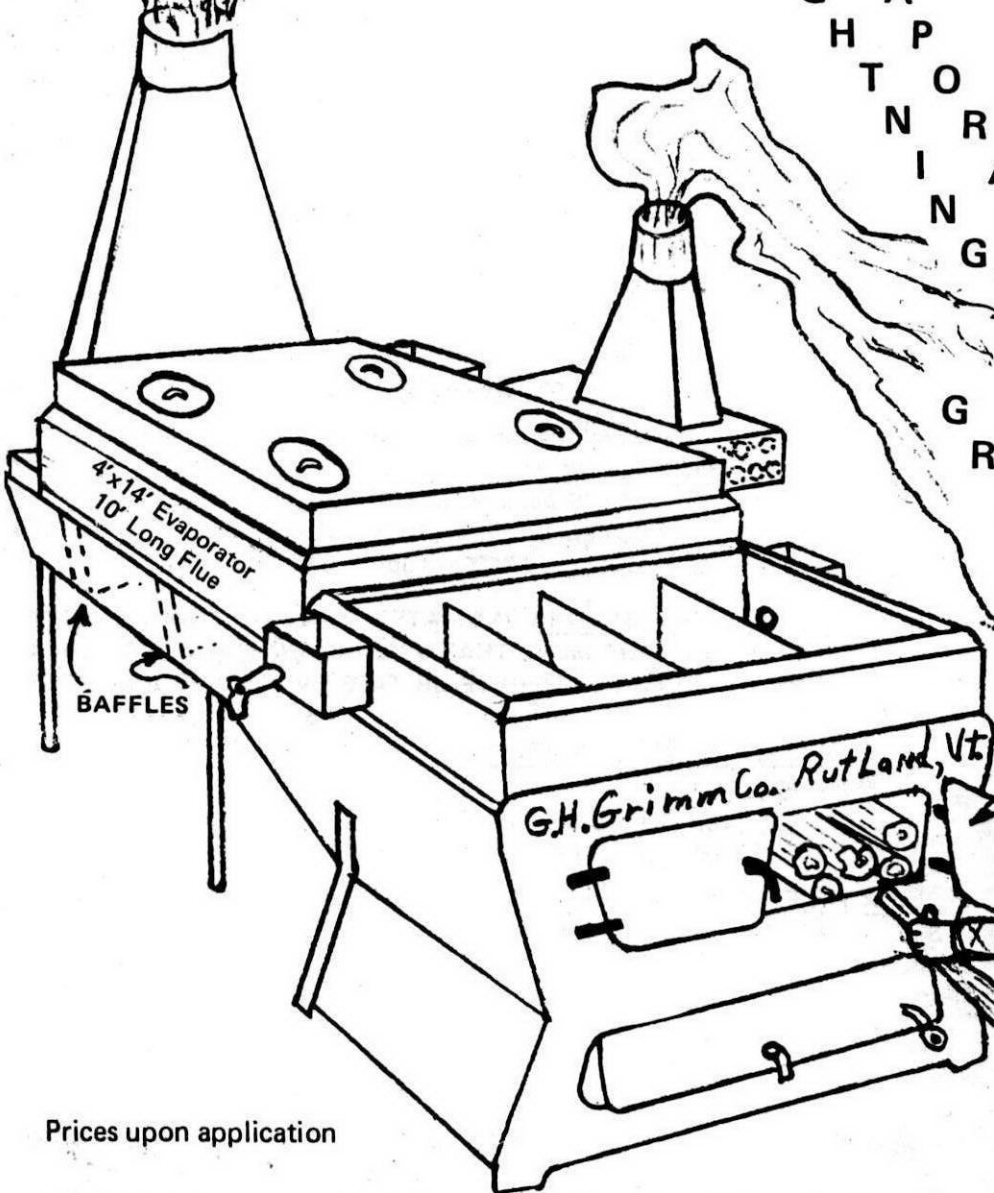


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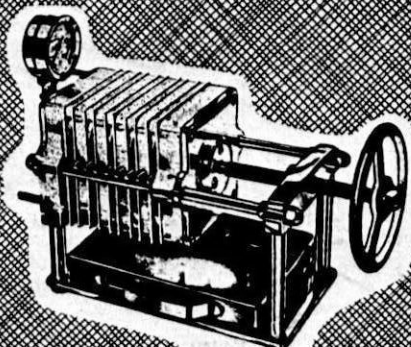
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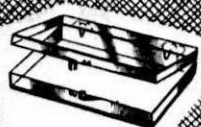


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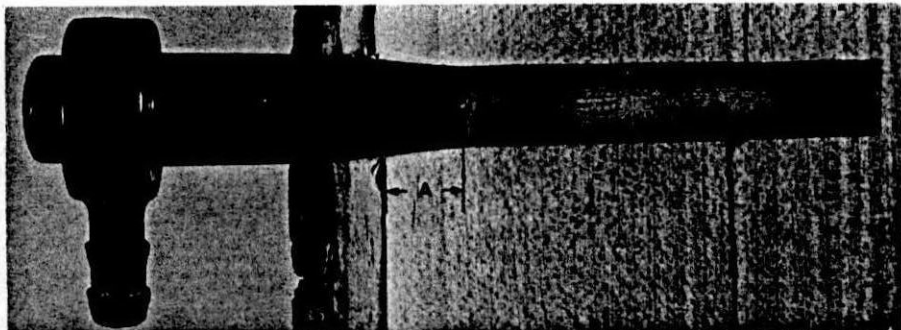


Figure 1.—This cutaway view shows a conventional plastic spout in a sugar maple taphole. This spout appears to seal off the area of young xylem, indicated by "A".

MAPLE SPOUT MODIFICATION SHOWS NO ADVANTAGE

Arthur H. Rye, Forestry Technician
and

Russell S. Walters, Research Forester
USDA Forest Service, Northeastern
Forest Experiment Sta., Burlington, Vt.

The sweetest sap from a sugar maple taphole flows from the young xylem or wood tissue nearest the bark (*Gibbs 1969*), but this portion of the taphole appears to be blocked by the conventional spout (Fig. 1). Will modifying the spout allow the sap from this area of young tissue to flow from the taphole and be collected? When modified and conventional spouts were used on a group of maple trees in a Vermont sugarbush, there was no difference in

either sugar content or volume of the sap collected.

It had been suggested that the conventional 7/16-inch plastic spout might be made more efficient if the tapered portion of the spout that extends into

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the taphole were modified by cutting into both its top and bottom a slot about 1/2 inch long (Fig. 2). This slot was short enough that the spout could still seat properly and form a tight seal in the taphole. It was hoped that this modification would allow the sweeter sap from the young wood tissue nearest

the bark to be collected.

A 2-year study to investigate the modified spout was begun in the spring of 1972 in a sugarbush in the northeastern portion of the Champlain Valley in Vermont. The study compared the sugar content and volume of sap collected from trees tapped with both kinds of spouts. Two 3-inch deep taps were drilled into each of 20 trees; at random, a conventional spout was put into one taphole and a modified spout into the other. Total sap yields were collected from each taphole and sugar percentages were determined by use of a refractometer.

In 1972 the difference between conventional and modified spouts was 13.7 liters (average) per tree. In 1973, the difference was 1.9 liters, neither year's difference in average yield great enough to be statistically significant. There were no differences in average sugar content of the sap collected with both kinds of spouts; both were 3.1% in 1972 and 2.5% in 1973.

The results indicate that modification of the spout had no effect on total sap yield or sugar content of the



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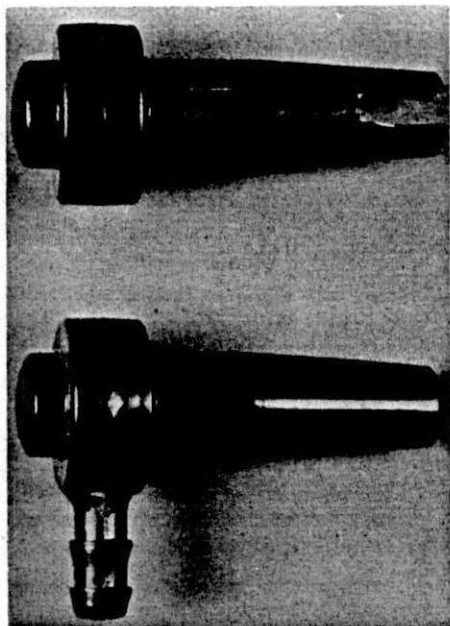


Figure 2.—The upper figure shows from above the 1/2-inch long slot cut in both top and bottom of the modified spout. The lower view shows the spout from the side.

sap. In both years of the study, the variations in sap yield and sugar content were much greater between trees than if they were between treatments. There is no reason to recommend modification of the conventional spout.

On the other hand, there are reasons to discourage such modification. We found it very difficult to remove the modified spout without breaking that portion of it that is inserted into the taphole. Also, as more producers rely on natural or artificial vacuum in collecting the sap, it is important to have a properly seated spout. The conventional spout is more easily seated properly than is the modified spout.

Literature Citation:—

Gibbs, Carter B.

1969. THE EFFECT OF XYLEM AGE ON YIELD AND SUGAR CONTENT OF SUGAR MAPLE SAP. USDA For. Serv. Res. Pap. NE-141. 11 pp., illus.

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WHY VACUUM PUMPING INCREASES SAP PRODUCTION

Harry W. Yawney
Research Forester, Northeastern Forest
Experiment Sta., Forest Serv., USDA
Burlington, Vermont

Research in sugarbushes has shown that plastic tubing systems will yield greater amounts of sap than buckets. It has also been demonstrated that a vacuum pump attached to the main line of the tubing system will increase sap production even more. An airtight, leak-free tubing system on vacuum, can more than double the amount of sap collected.

Vacuum pumping accomplishes two things that account for this increase in production: it produces sap on days when sap would ordinarily not be running; and it increases the rate of sap-

flow during normal flow periods. Thus it will enable a sugarmaker to turn a mediocre season into a good year, and a good year into an excellent year.

Even with the promise of greatly increased sap yields, sugarmakers have been slow to adopt the vacuum pump. In an effort to encourage its use, I have given several talks in which I have tried to boil down the principles involved without use of technical jargon. The following report is based on these presentations; I hope it will clear up some of the mystery of vacuum pumping.

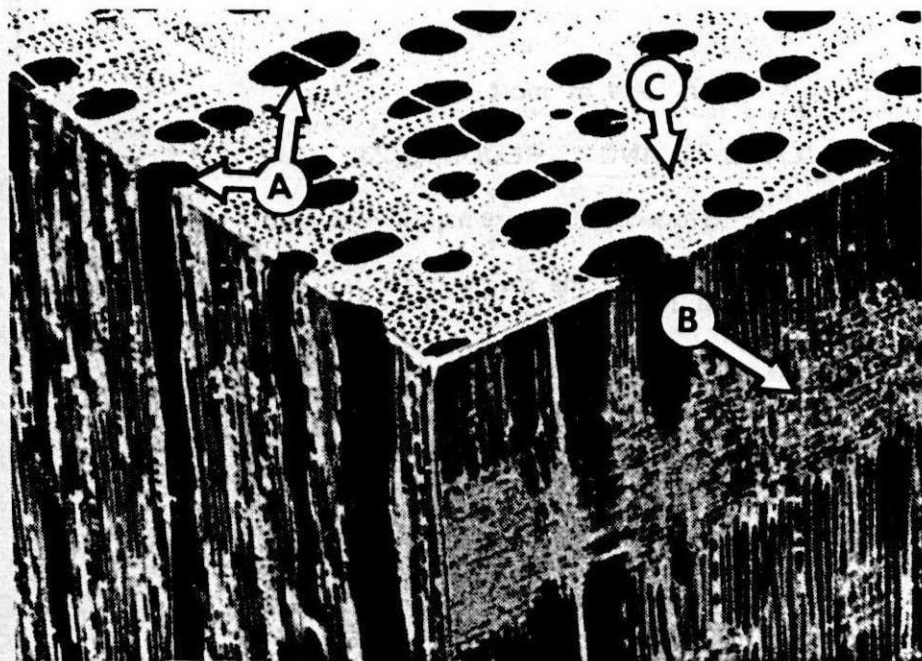


Figure 1.

In order to understand why vacuum pumps increase sapflow, we should have some appreciation of how sap moves in trees. Basically, sapflow coincides with a rise in tree pressure. When tree pressure is greater than atmospheric pressure, it is referred to as positive pressure. Under positive pressure, sap will flow when the tree is punctured, as by a taphole. This simple fact has been known for many years, yet the source of this pressure, or what triggers it, is not well understood.

Plant scientists recently proposed that the rise and fall in tree pressure are due to expansion and contraction of carbon dioxide gas within the tree trunk, presumably in response to changes in temperature, to which the tree appears to be extraordinarily sensitive. The sequence of events leading up to a sapflow may go something like this: When the temperature rises above freezing, carbon dioxide gas in the cells

of the tree begins to expand. As a result, pressure is created throughout the tree. Pressure continues to build up until the tree, in a sense, becomes charged.

This view is probably an oversimplification of the sapflow mechanism, because we know many other factors are involved. Expansion of carbon dioxide gas to produce a positive pressure may actually be the last step in a complex chain of reactions resulting in sapflow.

Although the mechanism of sapflow is still largely Nature's secret, the fundamentals are clear: Sap will run when pressures inside the tree are higher than atmospheric pressure, and it will stop flowing when the reverse is true. Old-time sugarmakers may recall that, if the temperatures are right, sap runs sometimes occur just before a storm. This is because atmospheric pressure usually drops as a storm approaches. The weatherman reports this by saying



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that the barometric pressure is falling.

To help explain the sapflow process it may be useful to examine the much enlarged section of a block of sugar maple wood shown in Figure 1. The large, pipe-like cells designated "A" are called vessels. These cells are the main water-conducting elements and they provide for very rapid vertical movement of sap in trees. The group of horizontally oriented cells designated "B" are called ray cells. One of their functions is to store carbohydrates, such as starches and sugars. They are the main source of the sugars found in the sap. Cells designated "C", which make up the bulk of the wood, are fibers. This is where the pressures inside the tree are thought to originate with the expansion and contraction of carbon dioxide gas. These cells are all completely interconnected throughout the tree, forming a highly complex sap transport system.

Figure 2 is a drawing of a cross-section through the center of a taphole, showing a greatly enlarged vessel segment. If you imagine that the vessel is filled with sap just to the brink of the taphole, it will illustrate the condition

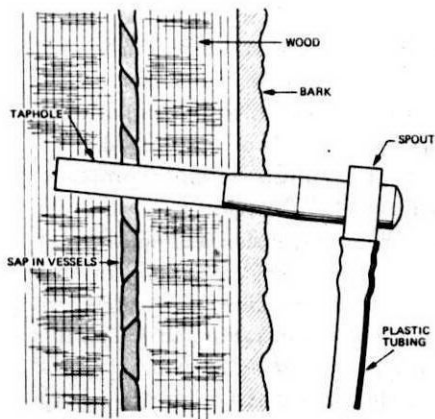


Figure 2.

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when the internal tree pressure is equal to atmospheric pressure. Sap will flow from the taphole when there is either a slight rise in tree pressure or a slight drop in atmospheric pressure. The second condition is brought about when vacuum is used.

It has been said that three good sap-runs make a sugaring season. If only three runs occur, the question must be asked, how many times did tree pressures approach, but not quite exceed, atmospheric pressure? In the light of what we know about sapflow, it must be assumed that these near-flow pressures occur quite frequently in the course of a sugaring season. This assumption seems to be correct, because we can take advantage of these near-flow pressures and increase the number of sapruns by using the vacuum principle.

Vacuum pumping has the effect of lowering the atmospheric pressure in the tubing system, creating a pressure differential whereby the pressure inside the tree is greater than atmospheric pressure. This forces sap into the taphole and out into the tubing system.

Under perfect conditions, a mechanical pump is capable of developing a vacuum of something less than 1 atmosphere. When connected to a tubing system, the vacuum pump operates less efficiently. Applied vacuum will work only when the differential between internal tree pressure and outside atmospheric pressure approaches zero. Tree pressure must be within about $\frac{3}{4}$ of an atmosphere of atmospheric pressure before a vacuum pump can bring about a saprun.

It should be pointed out that for the vacuum to be applied at the taphole, the tubing system must be free of air leaks. It is important, therefore, that the tubing lines be patrolled frequently

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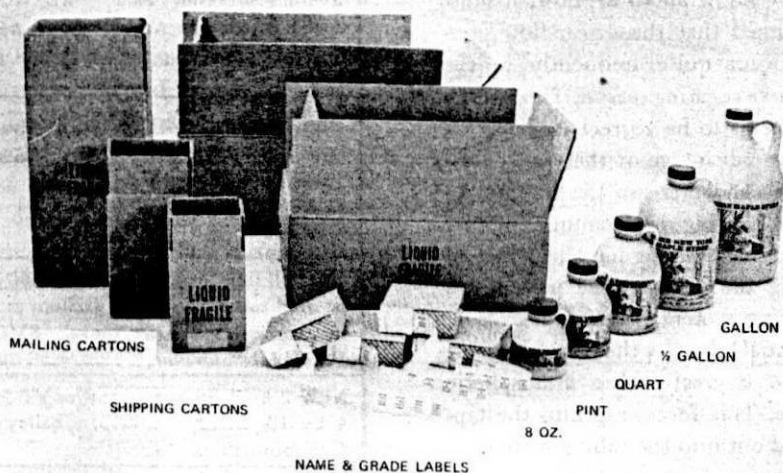
to check for leaks and correct any that are found.

Figure 1.—An enlarged piece of sugar maple wood. The large pipe-like vessels (A) provide for very rapid vertical movement of sap in trees. Ray cells (B), which contain carbohydrates, are the main source of sap sugar. The fiber cells (C) are where the pressures responsible for sapflow are believed to originate.

Figure 2.—Drawing, greatly exaggerated, of a vessel segment filled with sap to the brink of the taphole. In this situation, tree pressure is about equal to atmospheric pressure. Lowering atmospheric pressure in the tubing system with a vacuum pump will cause sapflow.

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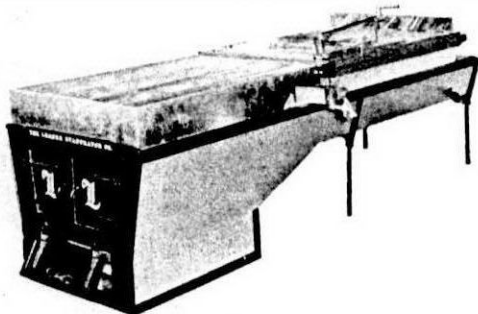


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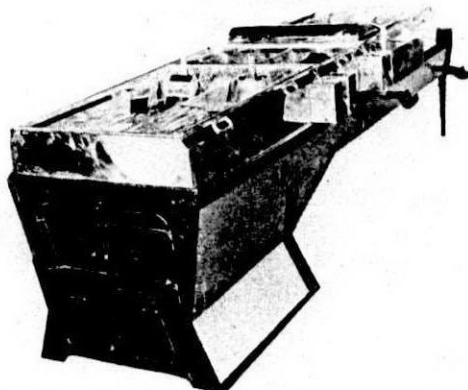
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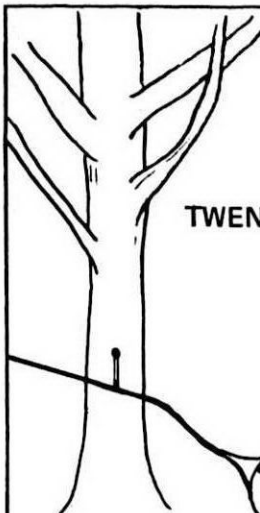
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