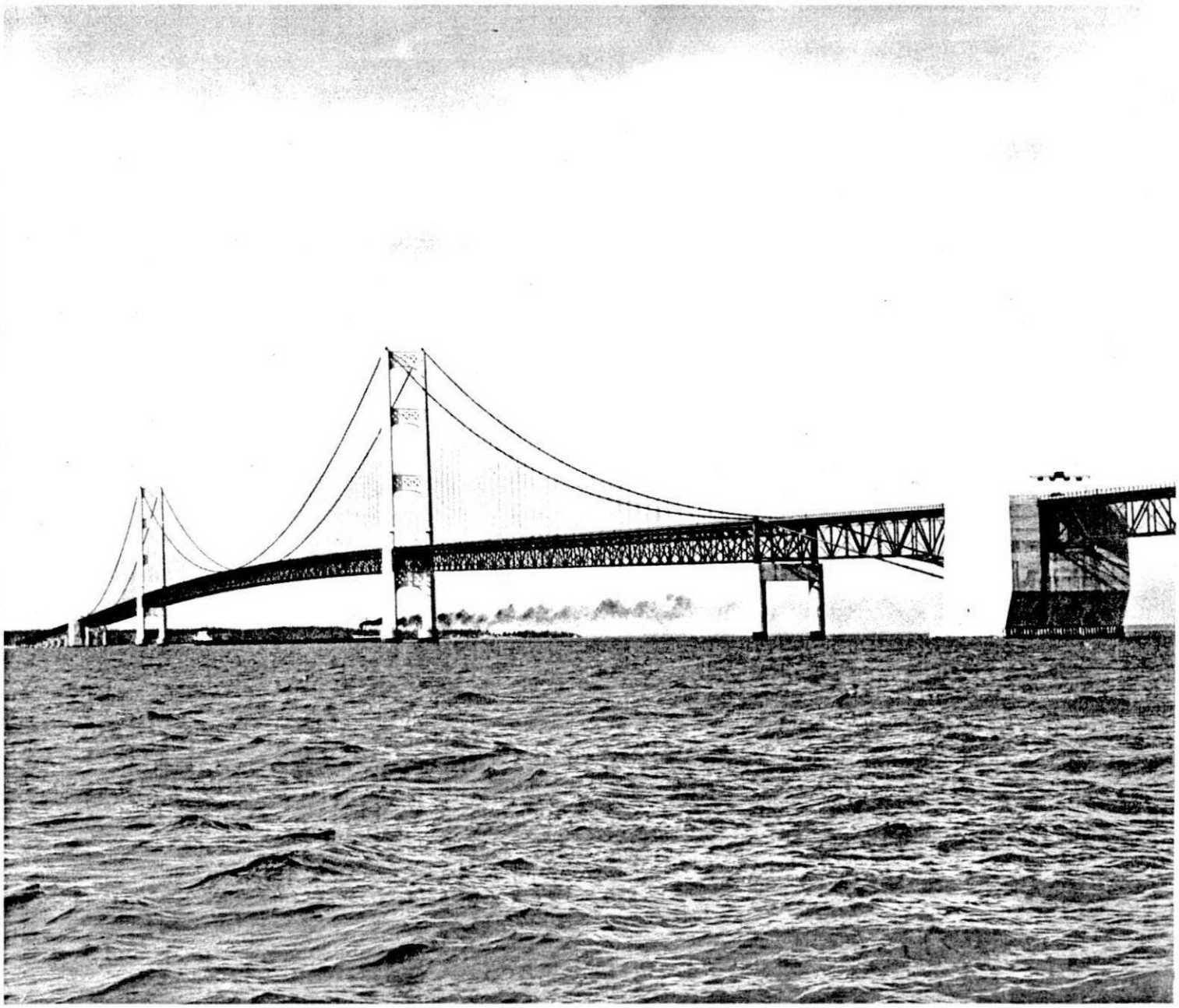
National Maple Syrup
• DIGEST •

PHILADELPHIA
LABORATORY



Vol. 6, No. 1 BAINBRIDGE, NEW YORK JANUARY, 1967

FROM TAP AND TANK

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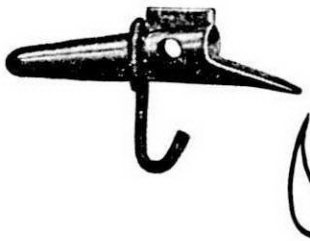
TO MAKING AND MOLDING ///



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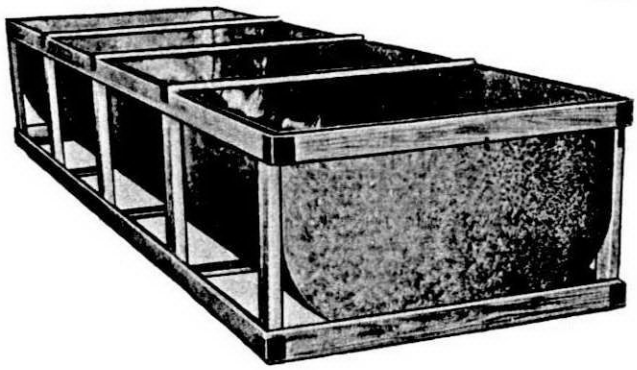

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NATIONAL MAPLE SYRUP DIGEST

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NOTICE
BACK ISSUES AVAILABLE

The following issues of the Digest have been printed to date:

Vol. 1, No. 1, 2, 3, 4
Vol. 2, No. 1, 2, 3
Vol. 3, No. 1, 2, 3, 4
Vol. 4, No. 1, 2, 3, 4
Vol. 5, No. 1, 2, 3, 4

We still have a supply of most of them but they are getting scarce, and they are expensive to mail. If you lack any, drop us a card stating which copies you would like and we'll send them if available.

COVER PICTURE

What does a bridge have to do with Maple? Just this: Plastic tubing demonstrations were held on each end of this bridge, across the Straights of Mackinac in Michigan. See "Tubing Demonstrations" in this issue.

Everyone's Out of Step but Me!
or
Holy Smoke - Didjaever Notice What a Bad Shape The World Is?

by—the Editor's Editor
—Mary Lou

A very good friend commented on the odd shape of the world now-a-days. She said it is tipping badly and getting pulled out of round—it's being stretched, I guess she means. She first noticed it when she climbed the hill in back of her house the other day. Why, the world has tipped and stretched so much, that hill was twice as steep and twice as long as it was when she last climbed it a year ago! I have noticed that the half mile to town has stretched too. It used to take me 15 minutes to walk it, while now it has stretched so much it takes all of 25 minutes.

Then there are those inconsiderate people. Most inconsiderate of all, the printing people. Just as my arms began to get shorter, these people started printing 'phone books and postal directories in such very small print that I can hardly read them. Next to the printing people, the dry cleaning people are most inconsiderate. They have been shrinking all of my clothes!

I must get after the bureau of weights and measures too. I just noticed yesterday that a 25 pound sack of flour weighs at least 60 pounds now, but I don't get any more loaves of bread out of it.

The clock manufacturers are doing something wrong. My clocks take twice as long to run from 6:00 A.M. to 6:00 P.M. as they take to cover the time from 6:00 P.M. to 6:00 A.M.

Then there is the fact that "they" let all those little kids be freshmen in college. Also, all those people I went to school with, *said* they were the same age as I was, but now they must be at least ten years older than I.

THE BOSS says I'm "plump" (he spells plump funny—he spells it F-A-T). But you see, my weight is O.K., I'm just too short. So, being short, you would naturally think I could reach the floor alright, but it tips so, that when I reach down to pick up something, I can't reach anymore, and our stairs are almost straight up and down.

I have proof too, that a few other things are really wrong. The needle people didn't use the best steel when they made needles. That little hole is closing right up tight. My wet mop pushes so hard now, I just know that "they" are putting glue in that stuff I use to mop my floor. We ought to have our water tested too—my steam iron gets awfully hard to push sometimes, I think we must have HEAVY (! !) water.

Last, but not at all least, our bathtub has been doing a peculiar thing lately. It *looks* alright, but when I go to get in it, it sinks way down to the basement and doesn't come back up until I have stepped (stepped?)—climbed up out.

I am just fine, and I hope all of you are fine too—but do watch it—the rest of the world is in awful shape!

Happy 1967 to each and everyone.

ERRATA

Agriculture Handbook No. 134, "Maple Sirup Producers Manual," dated Revised June 1965.

Page 93, Column 1, Soft Sugar Canies:

Items (2) and (8). Change temperature to read 32° F.

The above errata was not noted when the article "Condensed Directions for making Maple Sugar Products was reprinted in the October Digest. In your issue, on page 6, No. 2 and 8 under "Soft Sugar Candies", change the temperature from 27 to 32 degrees F.

National Council Needs Help!!!

Once again the National Maple Syrup Council needs your help. This time the need is not as desperate as before, but it is equally important to the future of the maple industry. And as before, the subject is the Philadelphia Laboratory. First, let's back up a few steps and review what has happened in the last two years.

About January 1, 1965, the Agricultural Research Service announced that the Maple division of the Eastern Utilization and Development Division of the United States Department of Agriculture in Philadelphia, Pa. (hereafter referred to simply as the Philadelphia Laboratory) would be closed on July 1, 1965. This decision was made by Secretary of Agriculture, Orville Freeman, in response to President Johnson's economy drive. At the time he stated that "their work was finished and there was no need for further research on maple."

We all knew better than that and, through the combined efforts of the National Maple Syrup Council and about 7,000 individual maple producers, with the Maple Syrup Digest serving as a medium of communication, we were able to keep this laboratory open. However, their appropriation was cut in half which has somewhat hampered their activities.

NEEDS OF THE INDUSTRY

During the past two years, the need for research in maple has been increased by several developments. The first is cost of production. You are all well aware of the fact that every year it costs more to make a gallon of syrup. The price of equipment and supplies keeps increasing, perhaps justifiably so, since the materials they are made of cost more every year. Also, the new minimum wage law that was passed recently (while President Johnson was trying to keep down the cost of living) is bound to have an effect on both the cost of supplies and the cost of the labor you hire to make syrup. If we raise the price of syrup to cover the increased costs, it is possible to price it off the market and reduce sales, and the producer who sells in drums has little chance of raising the price.

The other alternative is to use labor saving equipment and procedures to lower the cost of production. Also, the shortage of labor which was experienced by most producers last season promises to be even more acute this year. These two specific items added to a whole lot of other problems such as bacteria control, better containers and packaging, flavor control, etc., makes us wonder if we hadn't ought to take a little longer look at the whole situation.

Just what connection does the Philadelphia Laboratory have with these problems? In the event you are not fully aware of what the laboratory has accomplished either by itself or acting in an assisting or supervising capacity, I urge you to read the next two articles printed in this issue. I'm sure you will be quite impressed. Now, back to the matter at hand.

The need for an increase in research on maple was recognized in October, 1965, by the Forestry Research Advisory Committee who, in their report, recommended that "research on maple be increased and expanded." It was also recognized by at least one organization in June, 1966, when the New York State Maple Producers Association requested that "the National Maple Syrup Council take steps to increase the research on production and usage of maple products by urging the Appropriations Committees of Congress to increase the appropriation of Maple Products Division of Eastern Utilization Research and Development Division of the U. S. D. A. in Philadelphia, Pa." This resolution was accepted by the National Council at their annual meeting, Oct. 5 and 6, 1966, in Antigo,

Wisconsin. (See National Council News, December issue of DIGEST.) The directors of the Council moved that letters be sent by the National Maple Syrup Council to all members of the House and Senate Agricultural Appropriations Committees and also to all Senators and Representatives from the maple producing states.

This will be done as soon as the list of the new Congress is published. However, as before, when Secretary Freeman threatened to close the laboratory, this letter will serve more to call their attention to the situation and to the request of the Council than to throw much of any weight. This is where your help is needed. The flood of letters you wrote two years ago to your own Representatives and Senators is what really caused them to change their minds and reinstate the laboratory. We have proof of that, and we can do it again. So write NOW to your local Representative and your two Senators simply asking them to back the recommendations of the Forestry Research Advisory Committee and the National Maple Syrup Council that the research on maple be increased and expanded by increasing the appropriation to the Maple Products Division of the Eastern Utilization Research and Development Division of the U. S. D. A. in Philadelphia, Pa.

Editor

The Maple Division of the Philadelphia Research Laboratory of the U. S. Department of Agriculture has now been functioning for 16 years. We have learned to sort of lean on them and to toss them those of our problems we find a bit difficult to handle. The real question, however, is what has the Philadelphia Laboratory really done to improve and modernize our maple industry, not promises of what they hope to do. We decided it was time we took inventory. This was such a job, with their work covering so many areas, that we asked Fred Winch to do a little research. Here's what he came up with.

Editor

Philadelphia Laboratory Accomplishments

by Fred E. Winch, Jr.
Extension Forester
New York State

Technical developments:

1. **Dial thermometer.** A real improvement over the "target" thermometer.
2. **Automatic syrup "draw-off."** A system of component American parts consisting of a thermo switch, or temperature sensors and solenoid valve that takes much of the guess work out of when to draw syrup.
3. **Fully automatic syrup "draw off."** Automatically compensates for changes in boiling point of syrup and water, due to changes in barometric pressures.
4. **Separate finishing pans.** Showed why separate finishing pans are necessary both to improve quality of syrup produced and reduce cost of operation.
5. **Steam venting system.** Developed a new and highly efficient steam venting system that does not require the use of fans or other mechanical devices. A prerequisite to the sanitary production of maple syrup.
6. **Germicidal lamp.** Adapted commercially available germicidal lamps for the preservation of maple sap and syrup. The use of these lamps, using only physical means for sterilization, do not alter the sap or syrup in any way.
7. **Better tapping methods.** Demonstrated that 3-inch deep tap holes produced more sap than did the conventional 2-inch deep holes.
8. **Germicidal pellets.** (a) Established that premature "drying" of the tap hole resulted from microbial growth in the tap hole and (b) developed the pellet which permit—need we say more about this?
9. **Prevention of Sap Spoilage** by microbial fermentation. (a) Related the amount of color formation, a grade determining factor, to the degree of microbial fermentation of sap and (b) established sanitary measures, both for use in the woods and at the evaporator house that reduce microbial fermentation to a minimum.
10. **Improved sap evaporation techniques** that improved the quality of maple syrup.
11. **Synthetic felt filters.** Introduced synthetic felts now almost universally used for filtering syrup.
12. **Salvaged "buddy" sap.** Developed a method for removal of the "buddy" flavor from maple syrup by fermentation making salable this essentially worthless product.
13. **Venting plastic pipe lines** used for the collection or transportation of sap.
14. **Brix scale hydrometers.** Introduced the use of the Brix scale hydrometers and advocated their replacement of the Baumé scale hydrometer.
15. **Liquid stem industrial thermometer.** Introduced the ¼° F. graduated industrial liquid stem thermometer for measuring the density of syrup solutions.
16. **Care of plastic tubing.** Developed methods for the washing and care of plastic tubing.
17. **High-flavoring maple syrup.** Developed the theory of maple flavor formation and invented the methods for producing greater intensities of maple flavor in maple syrup by both a batchwise and by a continuous method.
18. **Permanent color standards** for grading maple syrup. Development permanent glass color standards together with a wide field color comparator for precise grading.
19. **Central sap evaporation plants.** Developed processes for the large scale handling and evaporation of sap.
20. **Utilization of fruit and vegetable plants** as central sap evaporation plants.
21. **Removal of hard scale from evaporators.** Developed chemical methods for the cleaning of sap evaporators which can be used safely on the farm.
22. **Effect of sugar bush site** and the environmental factors on sugar sand formation.
23. **Fermentation.** An intensive study to locate the sites of fermentation activity in maple sap and the development of means for the prevention of sap fermentation.
24. Cooperated in the development of an **improved arch design for oil burners.**
25. **Oil burners.** Cooperated in establishing specifications for size and type of oil burners for sap evaporation.
26. **Multiple evaporators.** Cooperated in the design of multiple pan evaporators.

New Maple Products:

27. **High-flavored maple syrup.** A sim-

ple, inexpensive heat process was developed by which the flavor level of commercial maple syrup is intensified 4-fold or more. This process is being used almost exclusively in preparing pure maple syrup for making blended (cane-maple) table syrups.

28. **Maple-honey spread.** This spread was developed using a mixture of honey and maple, two complimentary farm produced foods.
29. **High-density maple syrup.** A process was developed to produce a high density maple syrup, 80° Brix, that will not crystalize at room temperature.
30. **Maple fluff.** A topping developed to create a market for the lower grades of maple syrup.
31. **Maple extract.** Developed process for a 10-20 fold maple flavored, alcohol-water extract. This flavor, which is free of sugar and acrid caramel flavor, has been used in ice cream flavoring.
32. **Maple chips.** Developed maple chips from high-flavored maple sugar, having a fractured texture and an oil coating, required for use in flavoring ice cream.
33. **Crystal coating of soft maple sugar.** Standardized the process for home use.
34. **Maple cream.** Standardized the process for home use.

Analytical Developments:

35. **Invert sugar.** Developed a simple method for home use to test for invert sugar in maple syrup.
36. **Analysis of the carbohydrates of maple sap.** This was made to obtain a better understanding of nature and mechanism of color and flavor formation, and showed that 99.95% of the sugars was sucrose and that invert sugar was not present in sound fresh sap.
37. **Nitrogen and amino acid analysis.** Nitrogen was found in only trace amounts in sap. These analyses indicated that maple color was not the result of a Maillard type reaction but was due to carbonyl polymerization.
38. **Carbonyl analysis.** Acetol, dihydroxyacetone, and glyceraldehyde were identified in the steam distillate of maple syrup to validate the hypothesis that the color of maple syrup was derived from carbonyls, resulting from sucrose breakdown products.
39. **Flavor and Color.** The isolation of pure flavor fractions and pure color fractions from maple syrup. These fractions, which are the only constituents of maple syrup of intrinsic value, were shown to exist in syrup in only parts per million. Both fractions have properties similar to the major constituent, sucrose. The color is a polymer with pronounced unsaturation, of indefinite chain length, and a molecular weight in excess of 6000. The flavor fraction consists of a mixture of carbohydrate derivatives and phenolics. (lignin precursors).
40. **Method for the analysis of syringaldehyde.** Syringaldehyde was shown to be the major constituent of the flavor fraction of maple syrup.
41. **Malic acid analysis.** A simple and rapid method for the determination of malic acid, the major acid of maple syrup, was developed and adopted by the AOAC as an Official Method for use in detecting the purity of maple syrup.
42. **Carbonyl compounds.** Development of methods for the quantitative analysis of five carbonyl compounds, acetol, methylglyoxal, glyceraldehyde, dihydroxyacetone and hydroxypyruvaldehyde in trace amounts and in the presence of each other.
43. **Sugar sand analysis.** Hundreds of sugar sand samples were analyzed, chemically and physically, to determine their amounts in syrup and to determine their composition so that these data could be related to the factors responsible for their formation.

Fundamental Research:

44. **Studies of the processes involved in maple color formation.** The color of maple syrup is an artifact which is formed during the heating process of evaporation. Studies showed that the color was derived from hexose sugars, which resulted from fermentation of sucrose. The hexoses were then converted in part to trioses by alkaline degradation in the boiling sap as it changed from pH 7 to pH 8-9. The trioses subsequently polymerized in the hot solution to yield the color bodies. This knowledge of the mechanism of color formation provided the required information for the development of sap handling procedures and evaporation methods which enabled control of color development and the production of the light colored top grades of syrup.
45. **Study of the changes that occur during the evaporation of maple sap to syrup.** The pH of sap, which is normally 7, rapidly rises to 8-9 during the first stages of boiling and then decreases to 7 toward the end of the evaporation period. Color and flavor devel-

ops most rapidly after the sap has been evaporated to a Brix of 45°. This information indicated the necessity of a finishing pan so that this last and critical stage of the evaporation could be closely controlled and the heating period kept as short as possible.

46. **Studies of model systems for color formation.** Studies with model systems of glucose solutions showed that the amount of color produced was a function of the alkalinity. Heating alkaline solutions of glucose produced dihydroxyacetone, glyceraldehyde, methylglyoxal and acetol. The color bodies were derived primarily from the latter two compounds of which the amounts were dependent on the pH of the solution.

47. **Model experiment to study the role of amino acids in brown color formation.** These studies showed that amino acids had no direct effect on the formation of color. Basic amino acids in solutions of glucose provided a basic media which produced triose carbonyls. The latter in turn polymerized to yield the color bodies.

48. **Maple flavor studies.** It was shown that maple sap, *per se*, contains no flavor. The flavor is produced from precursors during evaporation (boiling) and is nonvolatile at temperatures exceeding 260° F. Maple flavor formation was shown to parallel color formation indicating that the reactants, triose carbonyl compounds, of color are also involved in flavor formation. Analysis of the isolated flavor fraction of maple syrup showed the presence of compounds, such as syringaldehyde, which are related to structure to maple lignin.

Farm and Industry Liaison:

49. Dissemination of information. The work of the maple syrup research group has resulted in 104 publications including the first edition of the handbook describing the complete process of maple syrup manufacture. The first printing of 20,000 copies was exhausted in three years and an enlarged and revised edition has been printed. A number of additional manuscripts are also in press.

50. The Laboratory has been awarded six public service patents and one more is being processed.

51. The group initiated and arranged the Maple Industry Conferences which have continued on a triennial schedule; six conferences have been held.

52. In addition to publications, the research group has worked closely with the State and Federal Extension Service personnel by participating in their schools and institutes for maple syrup producers. Making the research developments immediately available at the tree roots level has accounted for much of the rapid progress in the maple industry.

?

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WHAT DO YOU THINK?

THE MAPLE SYRUP DIGEST

BAINBRIDGE, N. Y. 13733

Squeezing the Water Out of Maple Sap

by Lloyd Sipple

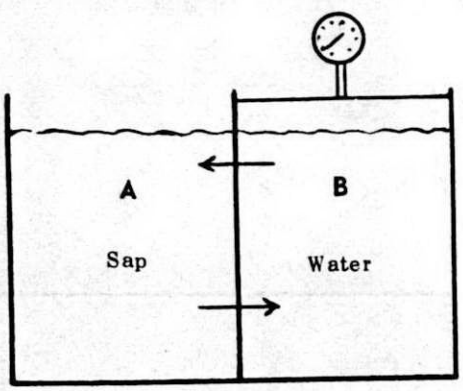
My editorial in the last issue stated that I would try to learn more about this long known laboratory curiosity which only recently has been made to work in a practical manner. Dr. Willits has done a lot to help clarify just what is meant by REVERSE OSMOSIS; how does it work and can it be efficiently, economically and practically applied to the concentration of maple sap. If he is right, and he has the facts to prove that he is, then this is the first major break through in bringing about a better and cheaper means of sap evaporation.

But let me explain to you as he has for the National Maple Syrup Council, plus a lot of answers to questions I put to him.

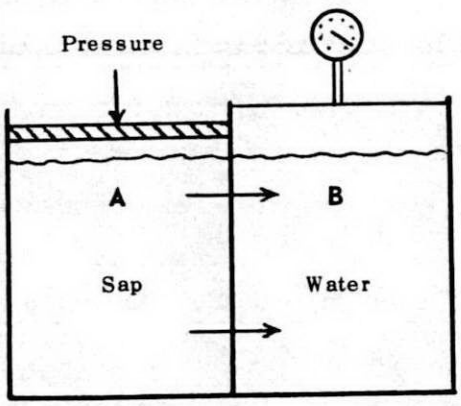
Six years ago reverse osmosis was essentially unknown. Then, because of the need for a cheap and easy way to reclaim drinking water from sea water, this laboratory curiosity was given a real hard look. Now, some six years later, after wading through six millions of research dollars (shared by the U. S. Government Dept. of Interior and private enterprise) we have a cheap, practical means of obtaining water in this fashion except that in the case of maple sap, we will throw away the pure water.

But let's stop and talk about first things first. Before we can understand reverse osmosis, we must review the principles of osmosis.

If we were to have a rectangular tank and place a divider down the middle of it, we would now have two compartments, one of which we will call A and the other B. Into compartment A we will place a concentrated solution (maple sap) and in compartment B we will put pure water. The divider is a semi-permeable membrane, which is a substance that will allow water to dissolve into it and flow through it, while other substances such as sugars that are in solution in sap, will not flow through it. We will also note that some of the water in B will flow through the membrane into the concentrated solution (sap) in A.



If we put a tight cover on compartment A with a gauge for reading the pressure, we will note that water will move from B to A until some definite pressure is built up in A. This could be as much as 25 P.S.I. This pressure is called osmotic pressure and will be different for each and every sap solution having a different concentration (degrees Brix).



Now if a pressure is applied to the sap in section A, and if this pressure is greater than its osmotic pressure, then we will force water to flow out of the sap through the membrane to the dilute of water side B. This is reverse osmosis.

Simple, isn't it? The only catch is that the semi-permeable membrane through which the water has to pass from the sap side to the water side is extremely thin, only a few hundred thousandths of an inch thick and the pressures required to cause any appreciable flow of water from the sap side to the water side of the membrane must be very high, in the neighborhood of 400 to 600 pounds per square inch.

So the real problem in converting this laboratory phenomenon to a working reality was to develop a membrane that would be semi-permeable (allow water to flow through it but nothing else) and be so constructed as to withstand high pressures without rupturing. This was done by a unique way of sandwiching these cellulose acetate films together, wrapping them around a core and inserting the whole thing in a cylindrical housing giving the impression that the water flows through the films lengthwise instead of the way it should go.

The amount of water that leaves the sap and passes through the membrane increased with the pressure applied but this has no effect on the ability of the membrane to hold back the dissolved solids in the sap. It is well know that these membranes hold back sugars, the principal solids in maple sap, but what Willits and his co-workers didn't know was—would the membranes prevent loss of the sap substance that ultimately forms maple flavor?

Last spring during the sap flow season, Willits and Underwood, using a laboratory model of a reverse osmosis apparatus, proved that the membrane allowed none of the sap solids (sugars, ash, flavor and color precursors) to be lost. They also proved that the concentrated sap obtained by the reverse osmosis apparatus, when boiled down to syrup, produced a product that had the full bodied maple flavor with all its notes. Further, they showed that none of the maple flavor or color was lost in the water removed by reverse osmosis.

Remembering that Willits and his group have proved that heat is necessary to form maple flavor and maple color, will the reverse osmosis process permit this to be done? The reverse osmosis is to concentrate the

sap only to 10°-12° Brix. This doesn't sound like much of a feat, but actually, in concentrating sap of 2.5° Brix to 10° Brix, 75% of the water is removed. In this new process, the final concentration of the sap is by conventional boiling and the heat required for this is not only enough to produce the maple flavor and color but is present at the right stage of the concentration process.

Now why all this dither about using this new process for taking water out of maple sap? This is the way I understand it from what Willits has said:

1. It is cheaper than by the boiling method. The removal of 75% of the water costs only 1/20th as much as by boiling since the only operating cost is the electricity used to pump the sap through the membrane.

2. The new process is done at room temperature so that sap is not heat damaged.

3. The cost of the reverse osmosis plant should not be any more, and perhaps less, than the present open pan evaporator plant of similar capacity.

4. The reverse osmosis plant is a cube only 2½′ x 3′ x 12′ in size, requiring a floor space of only 30 sq. ft. as compared to 400 plus sq. ft. for open pans of the same capacity. It therefore requires only a very small building.

5. There is no steam removal problem since it produces no steam.

6. Since the plants are small and easily operated, they could be located in many places throughout the maple area. The concentrated sap, because of its small volume, could be economically hauled long distances to a few syrup finishing plants.

Dr. Willits mentioned a lot more reasons why the reverse osmosis process for the concentration of maple sap may become the method of the future but I just don't remember them all. It appears to me that here is a new and revolutionary method that we are going to hear a lot more about. Oh yes, I almost forgot. Willits said that they are building a full scale model plant and hope to have it finished and in operation for the 1967 sap flow season.

You recall we said a year ago that if we could keep the Philadelphia Lab going (and we did, you and I) we could expect a lot more things to come out of it. Now look at what has happened in this short time!

Maple Tubing Schools in Michigan

by Floyd Moore
and Leonard Carpenter

Three tubing schools were held October 25, 26 and 27.

We started traveling north from the Lower Peninsula across the Majestic Mackinaw Bridge, and about fifty miles northeast we entered Chippewa County. The meeting was being held at the town of Rudyard. This part of Upper Michigan is quite flat with some gradual slopes.

The weather was typical for fall and perfect for being out of doors. James Neal (County Extension Natural Resource Agent) welcomed Bob Lamb of New York State, and about eighteen very interested maple producers and us at the 4-H center at Kinross.

The meeting started with an excellent film on "Production of Maple with Tubing" taken in Quebec. We then explained our own method of tubing installations. Leonard explained the ground method which works well for him. Floyd explained the aerial method which he uses and finds very successful.

On display was a complete line of tubing, fittings, a tapper and literature. All of this gave the producer an idea of equipment that is available. Many questions were asked here and later. This was all conducted in tune with jets roaring by the window from nearby Kinchlo Air Force Base.

We then traveled to one of the producer's Sugar Bush where we tapped, installed and demonstrated both methods of tubing installation. Pills were inserted in each tap hole and this tubing was to be left up for the spring season of 1967.

The next day dawned bright and beautiful as we traveled about 100 miles south of "The Bridge" in the lower peninsula to Kalkaska. We met Warren Cook, County Extension Agent for that county. After a brief meeting and lunch we went further south and west to Kingsley. This is a very concentrated maple area and fairly hilly.

We met at Reynolds Central Evaporating Plant, formerly owned by General Foods, the largest such plant in Michigan. This meeting was well attended by many maple producers, some of whom traveled 150 miles. Also attending this meeting was John Hodge, K. C. Festerling, Ed Redman, Andy Olson and Bob Tyler, all associated with The Michigan State University Extension Department. A tour was made of the plant. At the plant site were many beautiful maple trees providing us a chance to demonstrate the tubing installations to this group.

The following and final day of the meetings favored us with another beautiful day. This meeting was held in Shepherd, about fifty miles north of Lansing, our State Capitol. This brought us to the southern part of Michigan and some very flat country with different type of maple, namely Norway Maples, according to Les

Left to right: James Neal, Leonard Carpenter, and Floyd Moore.

Bell, a newcomer to this session of our meetings. He is with the Forestry Department of Michigan State University and was our host. The Shepherd Community Maple Association served coffee, donuts, and sweet rolls. We toured their community sugar house and tapped trees in the Village Park on perfectly level ground. No airplanes here, but farm tractors hauling wagons loaded high with corn and soy beans. These tractors were going up and down main street constantly. This was another good meeting and very well attended by interested maple producers.

At these meetings, the first of this sort held in Michigan, we were fortunate to have two maple syrup equipment dealers: Juan Reynolds of Reynolds' Sugar Bush, Anima, Wisconsin, and Robert Huxtable, Sugar Bush Supplies, Lansing, Michigan.

A few important items of interest that we would like to emphasize on the two methods of tubing installations are: We both feel that the new four ribbed tubing is best for the northern part of Michigan as it thaws out much quicker. Floyd is located in northeast part of the lower peninsula at Ocqueoc, Presque Isle County, bordered by Lake Huron. Leonard is located in northwest part of the lower peninsula at Harbor Springs, Emmet County on Little Traverse Bay, a part of Lake Michigan. Floyd uses the aerial system and 18" to 24" drop lines and has his main lines on suspended wire. This wire is left in the woods all year long.

Tapping for the tubing installations can be done early in February. He picks up sap from several tanks throughout the woods, which is pumped to a tank mounted on a power wagon, then transported nine miles to the "Sugar Shack" which is located near the house providing water, electricity and HELP from his wife Kay. The tubing is color coated and numbered to keep track of its locations. After the syrup season is over the tubing is taken down and washed, still assembled, in a chlorine solution. That is pumping this solution through the tubing.

Leonard uses a three foot drop line for the ground system, thus eliminating any possibility of the lower "T" turning up and making an air pocket. Any trapping of air in the lines has a tendency of slowing up or stopping the sap flow. All ground lines are kept on a gradual slope down to the holding tanks. These tanks are sunk in the ground so the main lines drain well. At the end of the season the ground lines are disassembled leaving only a spile, the drop and tee together. They are tied in bundles of ten and soaked in a tank of chlorine solution for one day. Chlorine solution is pumped through the other tubing and is coiled on a reel, tied with twistems. Then they are stored.

His sugar house is near their dwelling equipped with a rocking chair, electricity, water, and his wife Sophy. The evaporation is done with oil and finished with gas.

All of the Maple Producers attending these meetings and especially the Michigan Maple Producers Association wish to thank John Hodge, Jim Neal, and all the others, and especially Bob Lamb. Their help is greatly appreciated for we feel they gave us a much needed boost.

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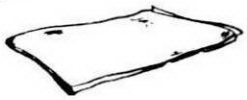
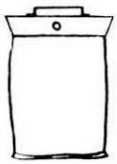


BAG



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Second Pennsylvania Maple Tour

Maple producers and their families assembled from all portions of the Pennsylvania maple belt early in October for the second annual Pennsylvania Maple Tour in Potter and Tioga Counties. Several neighbors from adjoining portions of New York State also participated.

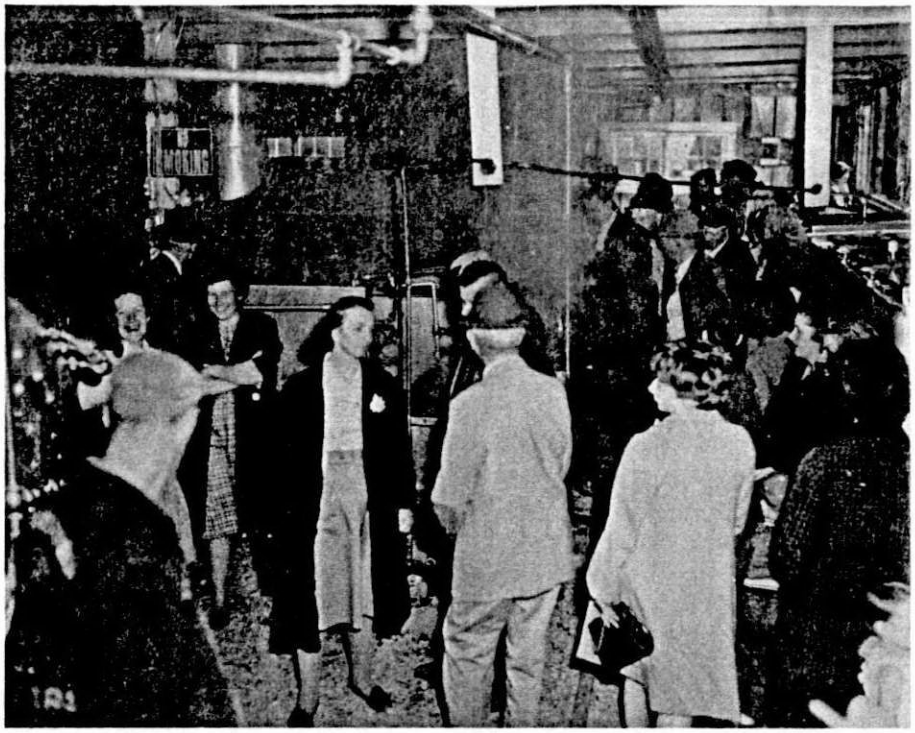
Foliage coloration was beautiful and the weather had cleared so that conditions were ideal. Even the wild black cherry, which is a prime timber species in north central and western Pennsylvania took on a deep red color this year. This, along with the various red shades of the maples and the yellows of other species painted many breathtaking views in the mountainous terrain.

The group toured north central Potter County the first afternoon to camps of Harlan Hamilton, James Blake and Everett Saulter with a glimpse of the potato harvesting process which was in full operation.

The fourth generation of Hamiltons is now working in the maple operation. Here a new quonset type building houses the oil-fired evaporator. Refreshments were served by the Hamiltons.

Mr. and Mrs. James Blake operate a natural gas fired evaporator with nine burners set at the front. Refreshments were also provided by the Blakes.

Garner Mitchell, Potter County Agent, questioning two generations of Hamiltons while a fourth looks on. L. to R., Mr. Harland Hamilton and County Agent Mitchell and Henry Hamilton and his grandson.

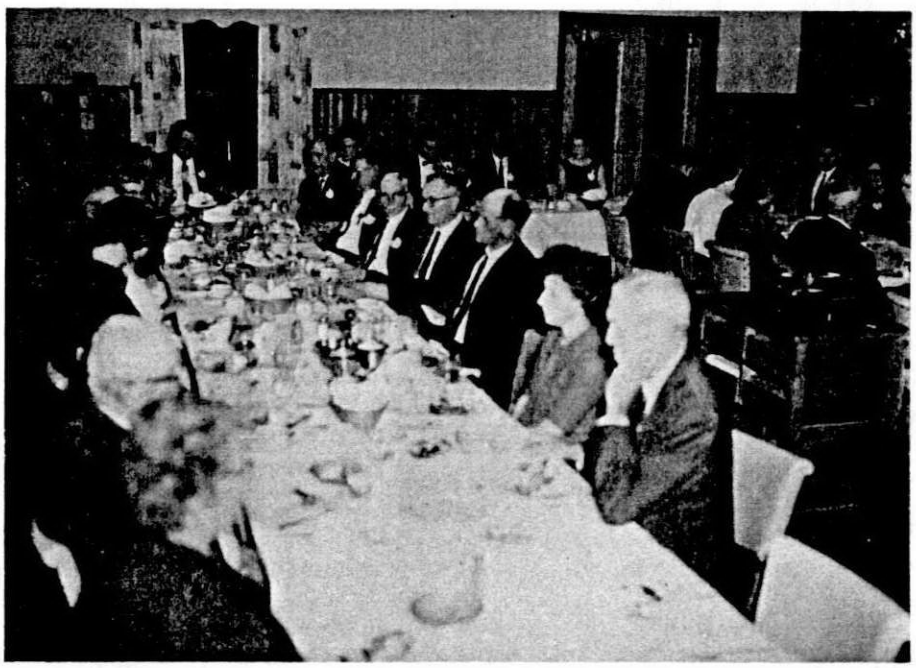


Inside the Everett Saulter sugar camp. Facing the camera, L. to R., Mrs. George Barker, Mrs. Gene Thompson, Mrs. Ralph Curtis.

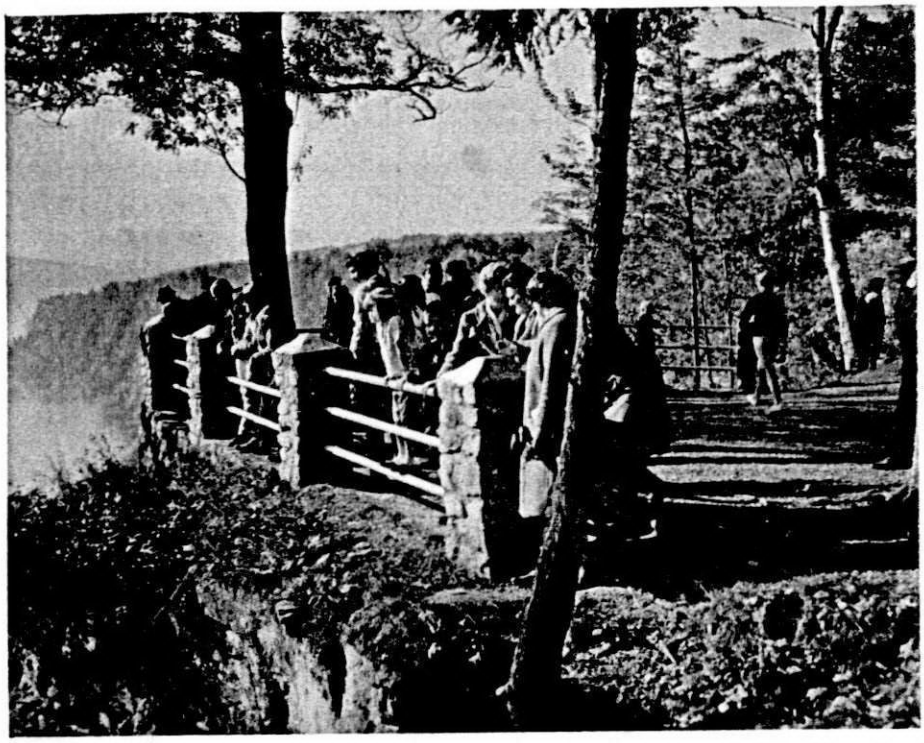
Mr. and Mrs. Everett Saulter burn the liquid residue from natural gas lines to fire a steam boiler. The steam is used to evaporate water from three pans in series and a separate finishing pan.

The evening banquet featured presentations by several of those attending. George Barker, President of the host Potter-Tioga Maple Syrup Producers' Association, was toastmaster.

John C. Kissinger summarized some of the maple research being carried on at the U. S. D. A. Agricultural Research Service Laboratory in



Banquet at the Potato City Hotel, Somerset delegation in the foreground. Head table in background: John Kissinger, Mrs. and Mr. George Barker, Mr. and Mrs. Robert McConnell, Tioga and Crawford County representatives on right.



Part of the group looking into Grand Canyon from Colton Point. Note fog in gorge.

Philadelphia. A great deal of work will be needed before a practical application of the reverse osmosis process can be made in maple syrup production.

Robert McConnell, Secretary-Treasurer of the Pennsylvania Maple Council, who had just returned from the National Maple Council meeting in Wisconsin, reported on highlights of that meeting.

Edward Curtis, President of the Pennsylvania Maple Council, who had also just returned from Wisconsin reviewed the accomplishments and provided a look ahead for the State Maple Council.

Extension Forester, Edward Farrand, presented a slide series on maple syrup production in Pennsylvania. It will form the beginning of a slide set which the State Council plans to duplicate and make available for use by any group in the state. Additional slides were promised by several of those present.

The group was then entertained and some square danced to the music of the County Gentlemen, Ulysses, Pa. As an added feature Mrs. George Barker sang numerous songs with the band.

The first stop Saturday morning was the Colton Point State Park overlooking the 1,000 foot Grand Canyon of Pennsylvania. The morning fog was just disappearing below to allow glimpses of Pine Creek and the railroad in the bottom of the gorge.

Norman Colegrove, his wife and daughter were hosts at the first maple camp visited. Norman's daughter represents the fourth generation of maple producers on their farm. They tap a natural gas line beside the camp to run the 4' x 12' King evaporator. Coffee, doughnuts, and sugar cakes were served by the Colegroves.

Wilbur Brion operates a sugar camp in southeastern Tioga County on a home farm which has been run by the same family for over 90 years. His two year old camp was built adjacent to the sugar bush on a main road. The sap collection is mostly by tubing.

A demonstration of the erection and taking down of plastic tubing was conducted by Robert McConnell and several of his children.

Lunch was served at nearby Salem Lutheran Church ending a very enjoyable two days of visiting and travel.

New York State Maple Schools

DATE		COUNTY
January 4	–	Oswego
5	–	Madison
6	–	Chenango
9	–	Cortland
11	–	Delaware
12	–	Otsego
17	–	Steuben
18	–	Cattaraugus
19	–	Chatauqua
20	–	Allegany
21	–	Wyoming

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LOOK- *What's New For The '66-'67 Season!*

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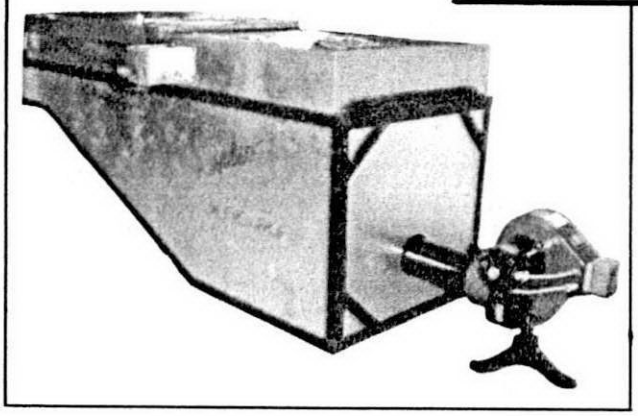
THE LABOR SAVERS



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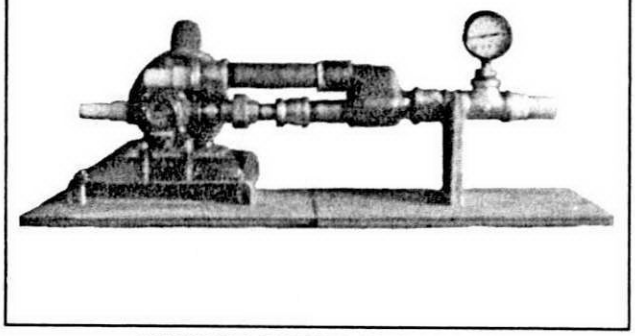

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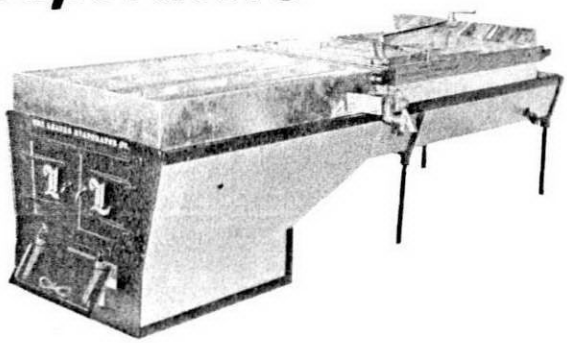

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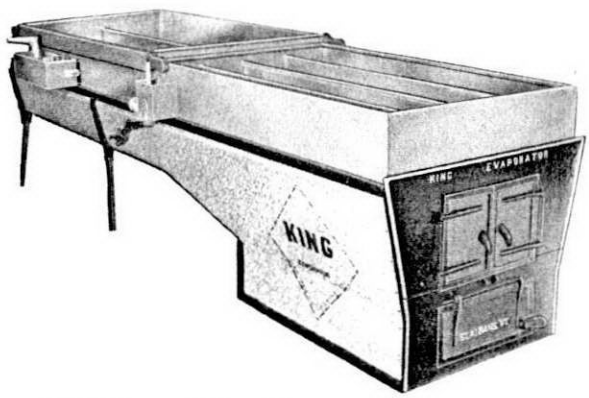

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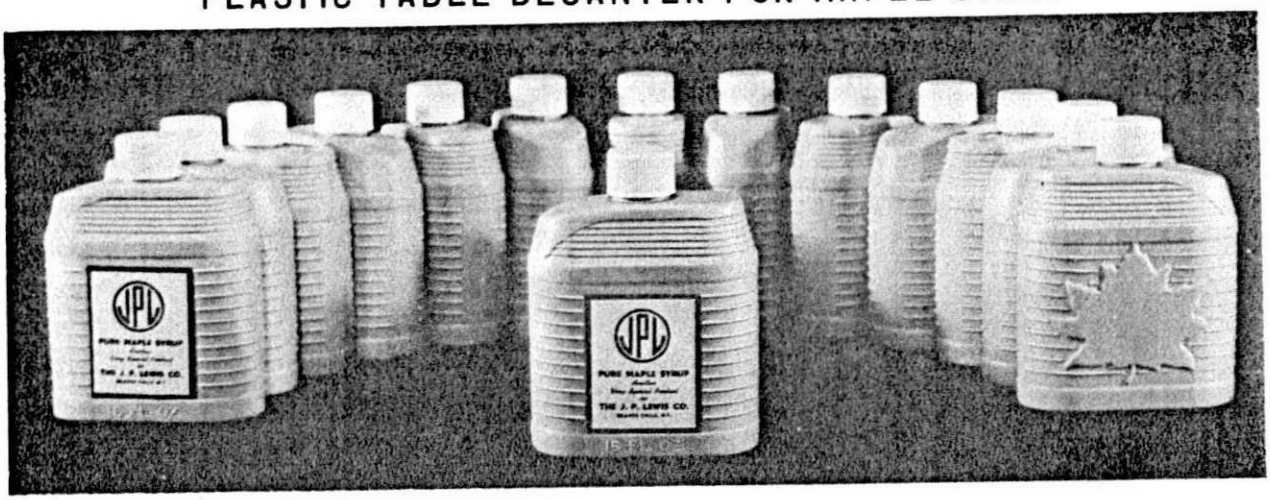

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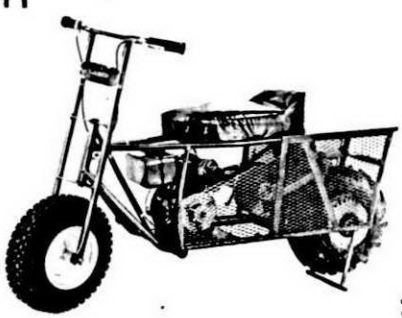

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