

Program 23 - SUGARIN' DOWN - March 10, 1941  
 (Sap's a-runnin' in the Sugar Bush)

SOMETHING TO DO AND TALK ABOUT FIRST

1. Find out why a maple grove is called a "Sugar Bush."
2. What kind of maple tree is sap taken from? Draw the leaf.
3. Is maple sap very sweet to the taste? How much sap do you suppose it takes to make a gallon of syrup?
4. Put a little starch in water. Does it dissolve? What happens when sugar is put in water?

DO YOU KNOW THESE WORDS?

spile          sap wood          evaporation          pressure          capillarity

LISTEN FOR THESE IDEAS:

1. What happens in the spring to the starch stored in the tree?  
Where is this starch stored?
2. What provides the pumping action? What is ideal sugar weather?
3. How much sap does a tree yield in one season?
4. Does it injure a tree to take sap from it?
5. How much sap does it take to make a gallon of syrup?
6. What is done with the sap to make the syrup?
7. Is there any difference in quality of syrup?
8. Is maple sugar made in any other country?
9. Did Indians make maple sugar?
10. Was there a time when maple sugar was about the only sweetening available?

SOMETHING TO DO AND TALK ABOUT LATER

1. Which do you think is richer in food values - honey or maple syrup?
2. How much does a gallon of maple syrup cost?
3. What is the weight of a gallon of good maple syrup? What is the weight of an equal amount of water?
4. How would you like to work in a sugar bush?
5. What should a farmer do to keep his maple woods in good production?
6. Where does Wisconsin stand as a maple syrup producing state?

Wisconsin School of the Air  
Afield with Ranger Mac  
March 10, 1941

SUGARIN' DOWN  
Sap's a-runnin' in the Sugar Bush

Hello Boys and Girls:

March is generally a boisterous, rowdyish month. It is the month in which winter and spring have a regular set-to battle, with winter backed up against the wall making a desperate fight to hold on. But March has a big heart, for it brings us spring, and tells us so by sending robins to proclaim the glad tidings. It brings us swelling buds, and it brings us maple syrup. On the morning of March 26th, robins just from the southland appear on my lawn. They are just as regular about it as the date on the calendar. These are the male birds dressed in their gay courting feathers. They cock their saucy eye as if to say, "Don't you think I'm looking gay?" And I reply, "You're the most welcome sight I've seen in many a day."

Then in a few days along come the females, dressed in more modest feathers. In a week or two, be on the lookout for "robin rackets". These are groups of three or four robins rushing pell-mell over the lawn, screaming at the top of their voices, but whether in mirth or in anger it is hard to tell. Always in the center of these mad rushes is the female, all the rest are males. It looks as though the males were united in rushing her off the place, but actually it is a courting performance. I like to imagine that the female shouts, "Who touches me first, wins?" "Agreed" shout the males, and off they go in this game of tag. The game is a short one, and quite soon, we see a nest appearing in the crotch of a tree.

It won't be long now before you will be able to observe the renewal of life that spring brings. It won't be long now before there will be activity in the sugar bush, for March, fickle March, with its cold nights and its warmer days provides the kind of pumping action that makes the sap flow in the trees. If you

have never heard the older folks tell about making maple syrup and sugar, you have missed a tale full of romance and hard labor; if you have never seen it done you have missed an interesting experience.

Making maple syrup is a pure American enterprise. It is made in no other place in the world. The early explorers found the Indians making sugar from the sap of the maple tree. (I supposed the Indians tried the sap of all the different kinds of trees but found the maple tree yielded the best sap for the making of syrup and sugar.) The Indians had crude methods, and the product was ill-tasting from the smoky flavor, but the white settlers improved on their methods, and for many years maple sugar was the only sugar used by the settlers. You understand that back in those early days there was no cane or beet sugar to be had, and so maple sugar was made in large quantities to supply the need for sweetening. To-day with cane and beet sugar so cheap, maple sweets are not in great demand except for flavoring of candies and ice cream. Maple ice cream must be flavored with pure maple syrup and not by a substitute, and so the ice cream trade takes more of the product of the maple tree than is taken in any other way. Ranger Mac looked up the amount of maple sugar and syrup made in Wisconsin in 1850 and 1939, and he found that in 1850 -611,000 pounds of the products were produced while in 1939 about 35,000 pounds. Of course, back in those early days there were great forests of virgin maple timber which since have been cut down. There is only one American enterprise of the early tree days of our country that has more romance and hard labor connected with it than making maple syrup and that is logging and the life in the logging camps. But logging days are gone and you will never know this enterprise except in pictures and song and story. But there are still many "sugar bushes" in Wisconsin, and if there is one near your school it would be a worthwhile trip for you to make when the

activity is at its height. Wisconsin is the seventh in rank in the United States as a maple syrup and sugar producing state. The counties that produce most of the maple products in Wisconsin are Clark, Pierce, Marathon, Marinette, and Shawano counties. In fact, you take a soil map of Wisconsin and look up the regions of the heaviest soil, there you are quite sure to find the maple tree growing and maple syrup produced. The states of New York, Vermont and Ohio are the largest producers of maple sugar and syrup in the United States.

Well, it is time to hit the trail for the sugar bush. So get on your duds, put on your rubbers and off we go! And here we are! Not a bush at all, but a grove or woods with most of the trees sugar maple trees, one foot to two feet in diameter, 50 to 70 feet high, fine trees, with buds just beginning to swell on them; oft times called hard or rock maple as well as sugar maple- one of America's finest trees. If Ranger Mac were to ask his trailhitters what tree they like the best, he thinks that the sugar maple would get the largest number of votes. The wood of this maple is hard, durable, has a beautiful grain and takes a fine finish. Chances are the tops of your school desks are made of maple, for most of them are; the recitation desks are in all probability made of maple; so are the floors in your schoolroom and your homes, the broom handle, the pointer, your ruler - wherever there is a demand for fine finished article, one that will stand plenty of wear and take a fine polish, there hard maple is often used.

When the warming suns of March hit the crowns of the trees, the buds awaken, and the starch which was manufactured by the leaves last season and stored away in the tree is changed to sugar. You see starch does not dissolve in water, but the tree changes it into sugar. So as sugar it can be dissolved by the water and carried by the sap. This sweetened sap is food for the tree, and also food for man if

he will gather it. The amount of <sup>sugar</sup> carried by the sap is quite small; so small that the sap does not taste sweet- only about 2% of the sap is sugar. So you can guess right away that it takes quite a bit of sap to make a little sugar. There is no time to lose when the sap starts to flow, for the early run of sap is always the best. So Mr. <sup>sap</sup> Gatherer gets busy right away. Fact is he has made all preparations long before hand. His pails and other containers are all cleaned, he has purchased his spiles or spouts, his evaporation tanks are all set, and a large supply of wood is piled up nearby. In to each tree he bores a clean cut hole, slanting slightly upward, about 3/8 of an inch in diameter and about 2 inches deep, just nicely into the sap wood. Into this hole he inserts a hollow tube, called a spout or spile. This he taps lightly with a hammer. In olden days these spiles were made out of sumac and elder berry branches but today's spiles are manufactured out of metal. On the spile the man hangs a pail, and the sap drips into the pail. Generally only one hole is drilled in a tree, and more often than not this is on the south side of the trunk. Why do you suppose the south side is selected for this tapping of the tree? That is right, because the sun shines from the south, and increases the flow on that side. But sometimes, when most of the crown of the tree is on the north side, then the tree is tapped on that side. Now we have the tree tapped and the sap is starting to drip into the pail. Sometimes it drops slowly as drip, drip, drip,- about one drop a second. Sometimes it drops faster as drip, drip, drip, drip - about as fast as you can count. The rate of flow depends sometimes on the tree, how much food the tree stored away the last season, sometimes on the time of day, sometimes on the weather. There is always a better flow of sap when the nights are cold, freezing, followed by bright sunny days. Such weather is called maple-sap weather. Some springs are warm and

damp without much change in temperature between the day and night. Such weather retards the flow of sap. Cold frosty nights followed by bright sunny days cause the sap to flow. I heard a man say that a little wind in the day time increased the flow. But it also blows twigs and dead leaves into the pails that are hanging on the spiles, so it is a good practice to keep the pails covered. Because the flow of sap is different in each tree, Mr. Sap Gatherer must watch the pails. When one pail gets full, he will empty some of the sap into the pail hanging on a neighboring tree where the flow is less rapid. In less than a day's time all pails are full. He then collect~~s~~ the sap by hauling a vat on sleigh runners, or maybe by pouring it into barrels hauled on a low sleigh. Right through the sugar bush he drives, emptying the buckets into these containers, and hanging them on the spiles again to catch more sap. The sap is then taken to evaporating house. Here it is poured into large flat pans under which is a large fire box made of brick. The sap is not allowed to stand long after collecting because it ferments and get sour. Sour sap means a very poor quality of syrup. A fire is built under these large flat pans and the sap is boiled and boiled and boiled maybe throughout the night until most of the water is driven off and the thickened syrup is left. If sugar is wanted this syrup is put into smaller pans called sugaring-off pans and boiled some more until it is so thick that when it cools it hardens into sugar.

And so throughout the whole night  
The foaming pans pour out their clouds of steam;  
and when darkness falls among the trees  
The fires send over the snow their ruddy gleam.

There are many practices that Mr. Syrup Maker must follow to make the syrup clear by getting the impurities and sediment out of it, but we won't discuss them here more than to say that cleanliness is next Godliness in maple syrup making, the same as

in other things.

How much sap does it take to make a gallon of syrup? It takes 40 to 50 gallons of sap to a gallon of syrup. And it takes plenty of wood to do the evaporating too.

How long does the sap run in the spring? It varies from year to year. Generally it is from 20 to 30 days. In one sugar bush in 1891 the sap ran for 57 days. That is about the longest on record.

How much sap does a tree give in one season? All the way from 10 to 40 gallons in one season.

Does tapping the tree season after season harm the tree? It doesn't seem to. Nature heals the little wound and the next year the tree is not tapped in that place. The tree does not seem to miss the food taken from it.

What makes some trees flow faster than others? We can only make a good guess. The rate of flow depends somewhat upon the location but mostly upon the size of the crown. The larger the crown the more leaves the tree will have and the more food stored away, also the more surface for the sun's rays to hit. And there is another thing you should know. A good sugar bush is always thick with humus. Humus is decayed leaves and other vegetation. This humus holds the rain and melting snows and the water soaks into the ground so there is plenty of water deep down in the ground to make sap in the spring. A sugar bush that in April is full of trilliums and other wild flowers that like rich deep woods is a good sugar bush. Farmers who graze their cattle in the sugar bush destroy the soil conditions that make for a good sap flow - in fact destroy their sugar bush entirely in time.

What makes the sap flow in the tree - what pumps it up to the buds, feeding them, causing them to burst and develop into leaves?

Sometime the uppermost buds are 150 feet away from the roots and in case of the gigantic sequoias as much as 265 feet above the roots. Yet the water that is taken in at the roots must get to these top-most buds. How does it get there? This is one of the baffling things that scientists still guess at. It must be a combination of forces which we see illustrated most every day of our lives like suction caused by evaporation from the leaves; capillarity which takes water up a small tube and causes moisture to travel upward in the soil; and osmosis- a new word to many of you, perhaps, which is nothing more than force that causes one liquid to pass thru a membrane and make them equal. It is osmosis that causes water to pass thru the membranes in the tiny hair roots into the tree. These are some of the forces that cause the sap to pass upward in the tree.

Well, we have taken a rather hasty glance into the making of maple syrup. Ranger Mac hopes that each one of you will have a chance to visit a sugar bush, and that you may have a stack of pancakes floating around in a plate of this luscious fluid for breakfast sometime soon.

And as the Indian taught the white man how to make maple syrup so did the Indian leave us a beautiful goodbye with which Ranger Mac ends our trip afield for to-day:

May the Great Spirit  
Put sunshine in your heart  
To-day, and forevermore-  
Heap much!