

# Boiling Clean with Air

*By Vernon Wheeler*

I have been running a maple syrup operation over the past 30 years with my wife and children but started out making maple syrup with my father as a young boy 55 years ago.

Maple sugaring when I was a boy was a little different than it is now. Quite a few things were accepted back then that wouldn't be now. There was an abundance of lead in the tin buckets, spouts, sap tanks and tin evaporator pans. A creek provided the running water and the sugar camp floors were made of dirt. Packing syrup cold, a hunk of pork fat for defoamer, bird nests in the rafters, and horses shedding hair into the sap tank were also common. I remember it all very clearly but what I remember best of all was how good the syrup tasted. You would wonder how that could be possible with the way things were.

I believe that one important thing that allowed such nice tasting syrup to be made was removing all the scum and foam that formed on the boiling syrup. A skimmer was one of our most important tools and was used regularly. We knew back then that if the scum was boiled over and over in the pan it would cause darker and poorer tasting syrup.

With advancements in equipment, came hoods for the evaporators, closing everything in. This doesn't allow the syrup to be skimmed so the foam and scum forms a goop that keeps mixing with the fresh sap as it comes into the pan. With faster boiling evaporators, defoamers were also more necessary to keep the sap in the pans. The heat and steam of the boiling pans cause defoamer to go rancid very quickly, whether it is a dairy product, oil, or any kosher product. The result of rancid defoamer and scum being boiled over and over in the pan is dirty boiling, and off-flavoured syrup. Most of the scummy goop residue clings to the sides of the pans (and on any braces and preheaters) and will remain there from one boil to the next. I have found that the only way to fix this problem is to completely wash the pans at least every 12 hours or install an air bubbler.

I have been using the bubbler now for six years. It is installed in two 6'x16' evaporators and a 3'x8' finisher. I would say it is best described as a bubbler rather than an air injection because there is nothing being 'injected' into the product. It is just regular filtered air that we breathe every day being pumped into the bottom of the pan and bubbling through the sap. I have found that the bubbler allows me to boil as hard as I want without using any defoamer. Pumping natural clean air into the pans is better than adding defoamer of any kind to make a good tasting and pure product. I understand that a Canadian producer wants to be certified organic they are not permitted to use a bubbler but a producer in the United States can. I don't understand why the air you breathe in the U.S. would be considered organic but the air in Canada is not.

The bubbler helps to move the sap through the pans, partly because of no foam. The small amount of scum and foam that is normal with the boil is carried out with the syrup to the syrup filter rather than remaining in the pans. Years ago a wise maple man in Quebec spoke to me about how you can boil much

faster if you get rid of the foam in the pans. He explained that the bubble leaves from the bottom of the pan and the sooner the bubble is broken the faster you can boil. He was explaining how defoamer allows this to happen but the bubbler allows us to have the best of both worlds - no defoamer and a fast boil. You may expect that the bubbler bringing room temperature air into the pans would cool the sap and decrease the rate of boil but this is not the case. The bubbling action and lack of foam seems to compensate, allowing for the same rate of boil, only cleaner. The sap very quickly boils over the pans if the bubbler is turned off while the evaporators are running, proving that defoamer is required without the bubbler.

Adulteration is a major issue in the maple industry. Anything added to maple sap in the production of maple syrup is illegal. The addition of defoamer is permitted in the maple industry because it is necessary as a processing aid. With the new natural air bubbler technology as a defoaming option, the use of commercial and other organic based defoamers is not necessary. It could be argued that now that air can be used as a natural defoamer that adding defoamer of any kind is adulteration of the pure maple product.

With the use of the bubbler there is also very little nitre build up on the sides of the pans and about half the build up on the flues and bottom of the flat pans. The finishing pan is considerably easier to clean during the season with the bubbler because of the decreased nitre build up. By filling the pan with water, heating it, and then running the bubbler for an hour, only minimal scrubbing of the pan is generally required to remove the nitre.

The bubbler acts to eliminate hot spots in the pans as the syrup is boiling. Hot spots can contribute to darker colouring and stronger flavouring and off-flavouring of the maple syrup, particularly in the more delicate lighter grades. The bubbler does help make lighter coloured syrup but the taste is also a true and delicate maple flavour characteristic of the colour. This is a result of the cleaner more even boiling process. Not all syrup made with a bubbler is light though. Warmer weather and the growth of bacteria still brings darker syrups.

I have found that later in the season when the darker syrup is made, the steam smells strong and unpleasant. The resulting syrup is dark but with a nice dark flavour. My theory is that the bubbler helps to remove some of what would cause a harsher and more unpleasant flavour in the dark syrup, essentially cleaning the sap. It smells worse when the dark syrup is boiling but the syrup itself has a nice flavour characteristic of the colour rather than a more harsh flavour.

The bubbler must be installed properly to be effective, just like any other piece of equipment. The air fan should not be located in an attic or loft where there could be damp wood, near a fuel tank, down wind from any farm smells, or near any other strong smelling or contaminated areas. The air being used should be fresh and clean. The blower is also loud so is best not to be too close to your work area. The blower should have dual filters, one for dust and a carbon filter to remove odours. For best performance there should be a run of air pipe for every flue. It should be at the top of the flue not at the bottom. At the top you get double action from the bubble going down and then up. It also has to be installed so that it can be put in and taken out with minimal effort for easy cleaning of the pan.

There have been many rumours circulating about how the bubbler affects the syrup that I have found to be untrue. It was said that the colour of syrup produced with a bubbler was not stable and that it would darken more than what would be normal after it was bottled. We have never seen this. Another rumour was that maple sugar could not be made from maple syrup that was boiled in an evaporator with a bubbler. We have made hundreds of pounds of maple sugar each year since we have used the bubbler and have found no difference. There is also no difference in how easily the syrup can be made into maple butter, taffy, or granulated maple sugar. There has been research done on the bubbler with varying results. Research in Vermont has come out with some positive results while research in Quebec has come out with conflicting results. Something that may be hard to measure with research, but is the most important thing, is that it allows us to boil cleaner.

I have attended most of the North American Maple Syrup Council meetings since the 1970's and served as an Ontario alternate director for about 10 years. I think there is a flaw in the system when it comes to research. I don't think that the media and the general public should get the information from a research project until it is complete. The problem is when preliminary findings are released from a study, the media can grab onto it and distort it into bad news. I do think that the NAMSC research committee should be informed of ongoing research findings on a regular basis whether the research is funded by NAMSC or not. I think it would be beneficial to the industry if NAMSC played an even larger role in research. There should be a spokesperson for the U.S. and one for Canada that are appointed to speak to the media on behalf of the maple industry when it comes to important issues.

Issues that are being effectively dealt with in the maple industry such as the use of paraformaldehyde and lead have been reported in the media as though they are part of accepted practices within the maple industry that are being hidden from the consumers. New technologies such as the air bubbler have been reported in the same manner by the media. Two examples of this are an article in Maclean's magazine (The less sweet side of maple syrup, March 26, 2007) and another in Harrowsmith Country Life (Say It Ain't So, February 2010). One quote from the Harrowsmith article comparing regular maple syrup to organic states "How about 50 mL of regular maple syrup? Exactly the same, plus the possible drawbacks of formaldehyde, lead, insect carcasses and injected oxygen." It doesn't matter which part of Canada or the United States receives misinformation or a negative news story, it hurts the whole maple industry.

The high quality of maple syrup and the future of the maple industry are important to me. The information that I have presented here are my own findings and opinions. In closing, I encourage everyone to do what they can to work towards finding a balance of common sense and research in our industry. Maple syrup is valuable to our heritage and our livelihoods. We owe it to ourselves and the future of the Maple Syrup Industry to make smart decisions now and aid the media in relaying accurate information.