Heat your household from the outside

By Jacqueline Tresl

In our rugged days, when we were young and tireless, we kept warm with a big wood stove plunked down in the center of the house. For baths and dishwashing, we heated our hot water outside with wood. Every evening after supper, one of us filled the old hot water tank with a garden hose and built a fire under it. An hour later we had hot water, which we gravity fed into the bathtub or washing machine through a second garden hose.

For 11 years we lived that way. In the winter, we hauled in wet, snow-covered wood twice a week, stacking it beside the stove, watching as the mud and muck dribbled off the firewood on the floor. Every morning (and sometimes every evening) I dusted off the soot and wood stove dust that accumulated on the furniture tops. Returning home after a lengthy trip to town, the house temperature hovered near 40 degrees. Then we waited for an hour and shivered while the house ever so gradually warmed up. Our method of heating was a labor of love.

Heating hot water outside was nifty in the summertime (except when it was rainy or I had five loads of laundry to do and three dozen quarts of beans to can and the hot water tank needed to be refilled and refueled six times in one afternoon). But making hot water outside in the winter was trying. The hoses that filled and emptied the tank began to freeze overnight as early as December. They had to be drained and lugged inside every night. When afternoon temperatures never got above 20 degrees, the fire to heat the water had to be huge. The fires we built on the really cold days were so big it looked like we were trying to launch the tank into outer space.

Sometimes it was pretty tough. But we refused to be slaves to the utility companies. We have always restricted ourselves to using no more than 250 kilowatts of electricity per month. We didn't have natural gas readily accessible. We didn't want the hassle of propane tanks. Solar power gives out here by November. We stuck with our labor-intensive heating method, hoping eventually to find an economical and effective alternative.

The stove sets on a concrete pad in a small shed. The trench connects it to the barn. The shed make it nicer when filling the stove in bad weather.

My husband Mark grew up in Europe and, for years, talked about the outside wood stoves the Nordic people used when he was a little boy. The concept seemed silly to me. Why make all that heat outside when it's needed inside? How is the heat brought into the house? Isn't having to load a stove outside a pain in the neck?

Mark refused to be swayed by my concerns and was always on the lookout for an outside heating system that used a European design and was affordable. Most systems he looked at cost a fortune. All were made from cast iron and would eventually rust out. Some systems offered ways of heating domestic hot water, but their design was overly complicated.

One day, out of the blue, Mark found the stove for us. It is a woodstove that sits outside, positioned 10 to 100 feet from the building it will be heating. It can provide heat to one or two buildings, depending on the size and the square footage of the buildings. Once installed, it would supply an unlimited amount of 180 degree water for household use. During average winter months, it uses less than 50 kilowatts of electricity to operate.

Our stove came with a copper coil installed. The coil is what heats the water intended for household use. Our stove can provide 120,000 BTU of heat. We chose a model larger than we needed so that it would not need to work as hard, thereby cutting down our electricity consumption.

The stove heats the house by circulating back to the house the 100 gallons of hot water that surround its firebox. This hot water is fed through a pipe that connects to a preexisting furnace.

If the home owner does not have a furnace, as was true in our case, the other options are a fan coil unit or baseboards. The coil unit consists of a fan which forces air through a hot water coil. The hot air is then blown into the room to heat it.

We did not want the noise of the fan coil unit. We opted instead to hook the stove up to baseboards. Baseboards have the reputation of bathing a room in heat, the warmth gently radiating up along the walls. Baseboards keep the heat near the floor, where cold toes sit resting on winter nights. Because baseboards operate passively, they do not raise electricity consumption.

To provide for domestic hot water, a cold water line is fitted to the copper coil that rests in the walls of water that surround the stove. The cold water is then heated to 180 degrees while circulating through the copper coil. Once hot, it feeds back to the house to a preexisting hot water tank.

We did not have an indoor hot water tank. We hooked our hot water directly to our faucets. When we turn on our tap, the water that comes out is scalding. Water that hot can be dangerous to children, however, so it's best to connect to a hot water tank.

When our stove was delivered, the manufacturer's instructions recommended it be set on a concrete slab at least 10 feet, but no more than 100 feet, from the house. If two buildings were to be heated, the stove was to be spaced equidistant between them. Ours is 80 feet from our house and 70 feet from our barn.

To bring the hot water for heat and domestic hot water to the house and to

Our original plumbing system.

return the cold water back to the stove, two complete and separate loops of pipe are laid. The pipe needs to be made of polybutylene so that it won't corrode, leak at joints or deteriorate from the sustained 180 degree water. All fittings must be made of copper or brass, never steel (cast iron or galvanized). No rust must ever enter the system.

To lay the loops of polybutylene pipe, a trench from the stove to the house is dug. The trench must be dug deep enough that the pipe will lay below the frost line. The trench will contain the two loops of pipe, an electric line and a thermostat wire.

We set up our loops differently than recommended by the manufacturer (see diagram #1). The manufacturer recommends laying three of the four polybuytlene pipes into a schedule 35 pipe to provide additional insulation. They say that the cold water line that feeds the loop for domestic hot water, along with the electric power line and thermostat control wire, can lay directly on the ground in the trench. Instead, we chose to put the cold water line, electric and thermostat line into a separate schedule 20 pipe to provide extra protection.

Hooking up the polybutylene pipe to the back of the stove is straightforward (see diagram #2). The manufacturer provided easy-to-follow directions. If two buildings will be heated from one outdoor wood burner, a sec-

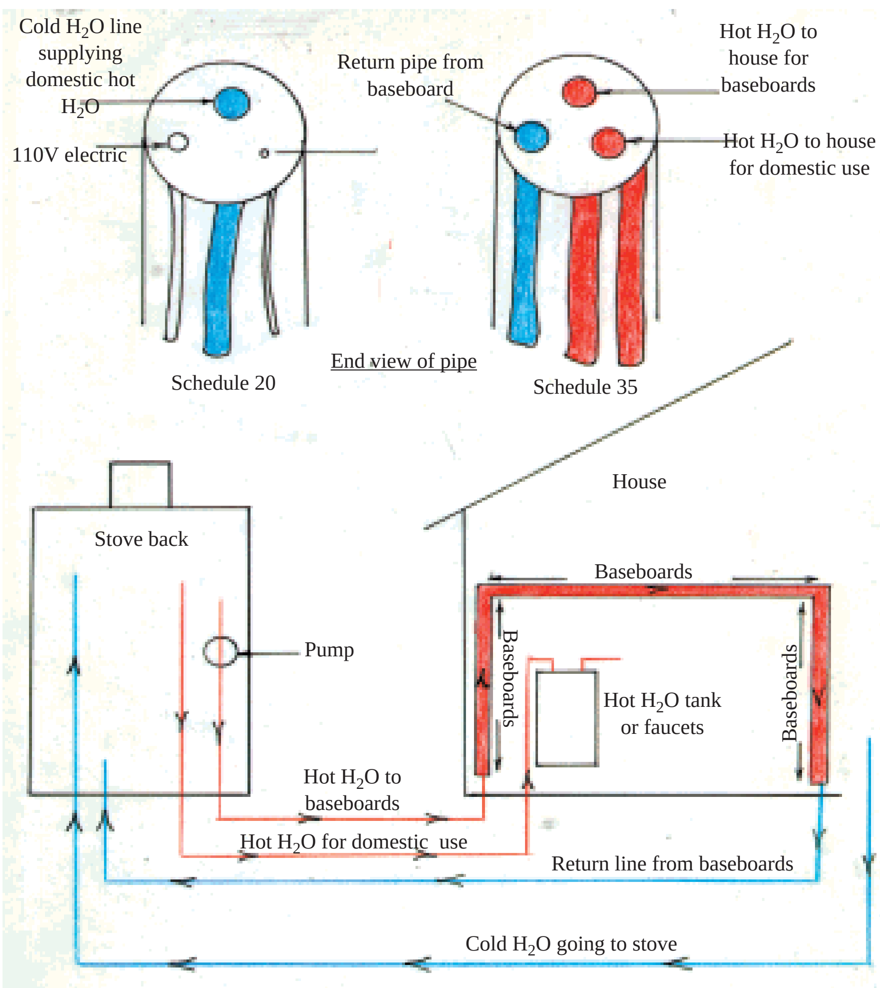

Diagram 1. Setup of our loops from the stove to the house

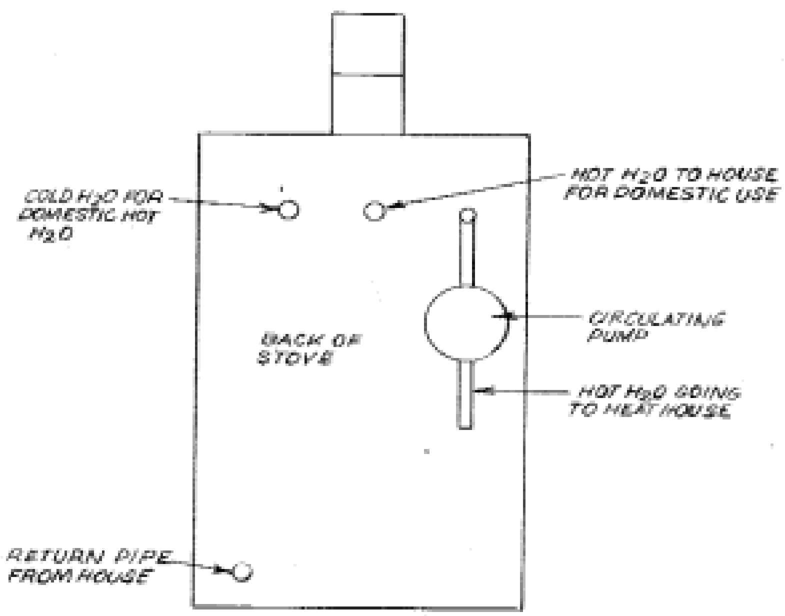

Diagram 2. Hook up the polybutylene pipe to the back of the stove

ond pump and additional ball valves will be needed.

Our wood burner takes firewood pieces as long as 30". During most of the winter, Mark loads the stove once a day, mixing in medium and large pieces of hardwood. When the temperatures are below zero, he fills the stove twice a day. In the spring and fall, when the baseboards come on only at night, Mark fills the stove every 36-48 hours. In the summer, when the stove is providing only hot water for household use, he fills it every three days. We use much less wood than we did with our indoor stove and outside wood hot water tank.

A conventional wall thermostat is wired back to the stove. As soon as the temperature in the house dips below where the thermostat is set, the pump kicks on at the stove and the hot water is circulated through the underground loop to the house and back. When the temperature of the water in the stove falls below 180 degrees, the fan kicks on and the firebox is filled with air. The fire begins blazing and the water is reheated to 180 degrees.

Heating our 1400 square foot log barn (with its 28 foot expanse from floor to ceiling) was a challenge. After digging a second trench and laying two more loops of polybutylene pipe, our budget was shot. There was no money left for baseboards or fan coil units.

Mark invented his own heating unit (see diagram 3) using car radiators. He removed two radiators from Cadillacs. Any radiator from any large car will suffice. Because his were not new or recored, he worried that there might be rust lodged inside the fins and tanks. Before using his radiators, he flushed them clean with "Iron-Out". The first flushing Mark mixed one quart of "Iron-Out" in one gallon of water and poured that mixture into the radiators. The radiators need to be full to the top with the mixture. He let that sit overnight. Next morning he flushed it out with a high pressure garden hose. He repeated the process four more times until the radiators flushed out rust free.

Once the radiators were spotless, Mark soldered on the connectors that would join them to the polybutylene pipes. One radiator is connected to the incoming polybutylene pipe. The second radiator is connected to the outgoing polybutylene pipe. A short length of copper pipe between them connects the two radiators together.

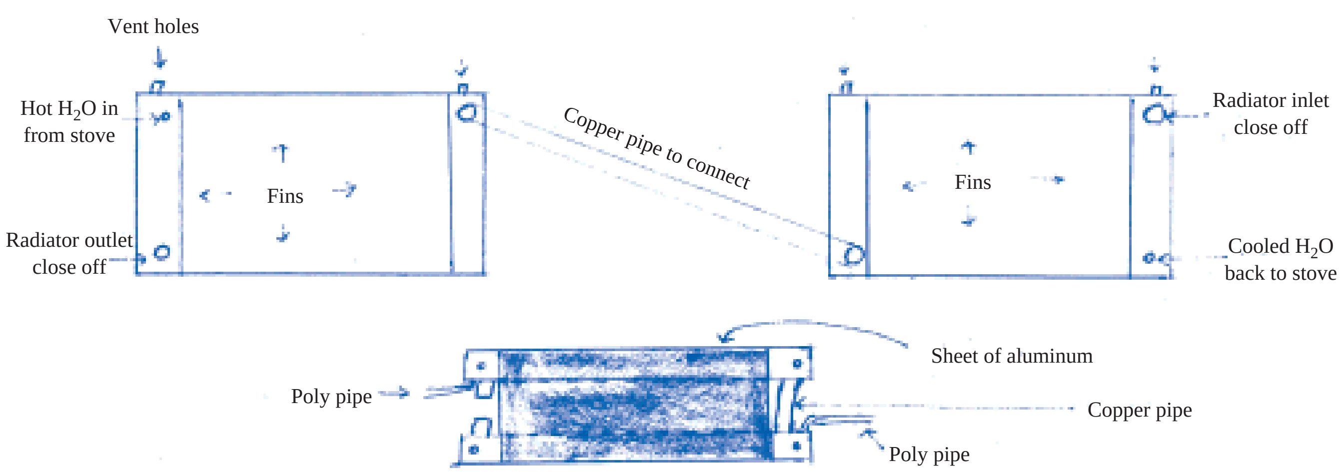

Diagram 3. A heating unit using car radiators

The radiators are joined by two sheets of aluminum. The aluminum acts both as brackets and providing a tunneling effect for the air flow. The 180 degree water is now ready to flow between the radiators. A squirrel cage fan from an old furnace placed behind the radiators lets the hot air blow through and heat the barn.

Mark only heats the barn when he is inside the barn working. All other times, the heat is off. When the weather is cold and the barn is not being used, the radiators must be protected from freezing. They can be drained of their water or, as in our case, stored below ground in the root cellar. If water is allowed to freeze in the radiators, they will burst.

For the past three years, we have used the outside woodburner. We have hot water running to both the house and barn. Mark can now degrease and clean his engines and tractor parts. I can shower off the horse with warm water after a strenuous summer ride. We can wash our greasy hands. A heated barn with hot and cold plumbing is a real luxury.

An outside wood burner solved all our heating problems. We use less firewood. Our electric consumption is unchanged. We have gained hours of extra free time because. we aren’t building hot water tanks and hauling in firewood. Our house is much cleaner and it stays consistently warm in the wintertime, even if we’re away from home all day. Best of all, the outdoor stove lets us grow old and be lazy and still have a good quality of life. Δ

Make lemonade without lemons

By John C. Fisher

0ne of the joys of living close to the land is the appreciation that a person develops for all plants in nature. One such plant is the sumac, also spelled sumach and pronounced either SHOO-mack, or SOO-mack. This is a group of small trees or shrubs belonging to the cashew family and to the genus Rhus. There are several species of sumac and they vary in size and area of the United States in which they grow. All have alternate compound leaves. Among the more common types are the staghorn sumac growing in the eastern U. S. from Canada into the south. The staghorn may grow into a tree of 30 to 35 feet. The dwarf sumach, which is usually a shrub, grows throughout the U. S. east of the Rocky Mountains. The smooth-leaved sumac, which also usually grows as a shrub, is found over much of the U. S. on both sides of the Rocky Mountains. These all have red berries in summer which grow in erect clusters. The poisonous sumac has white berries growing in drooping clusters and should be avoided. The foliage of the sumac turns a beautiful scarlet in fall adding much color to the autumn landscape.

The use of sumac berries was learned from Native Americans. They often dried them for use throughout the winter. The red berries can be used to make an attractive and good tasting drink. The berries should be harvested in mid to late summer, but before many heavy rains. The easiest way to harvest is to simply snip off the whole berry cluster or head. The berries are covered with many fine hairs which contain malic acid. This is what gives the drink its flavor. To make this drink, mash some of the berries in water, then stir them for several minutes. Strain the liquid through cheese cloth several times to remove the hairs. Now you have pink "lemonade" without using lemons. Sweeten the drink and serve as you would lemonade.

The juice from the berries can also be used to make a jelly. This is done by covering entire heads with water and steaming for 10 minutes. Pour off the liquid and strain. Add the same amount of sugar as juice and 1 box of pectin for 4 cups of juice. Cook until it begins to thicken. Remove from the stove and skim off the white foam on top. Pour into sterilized jars and seal or cover with paraffin. Δ