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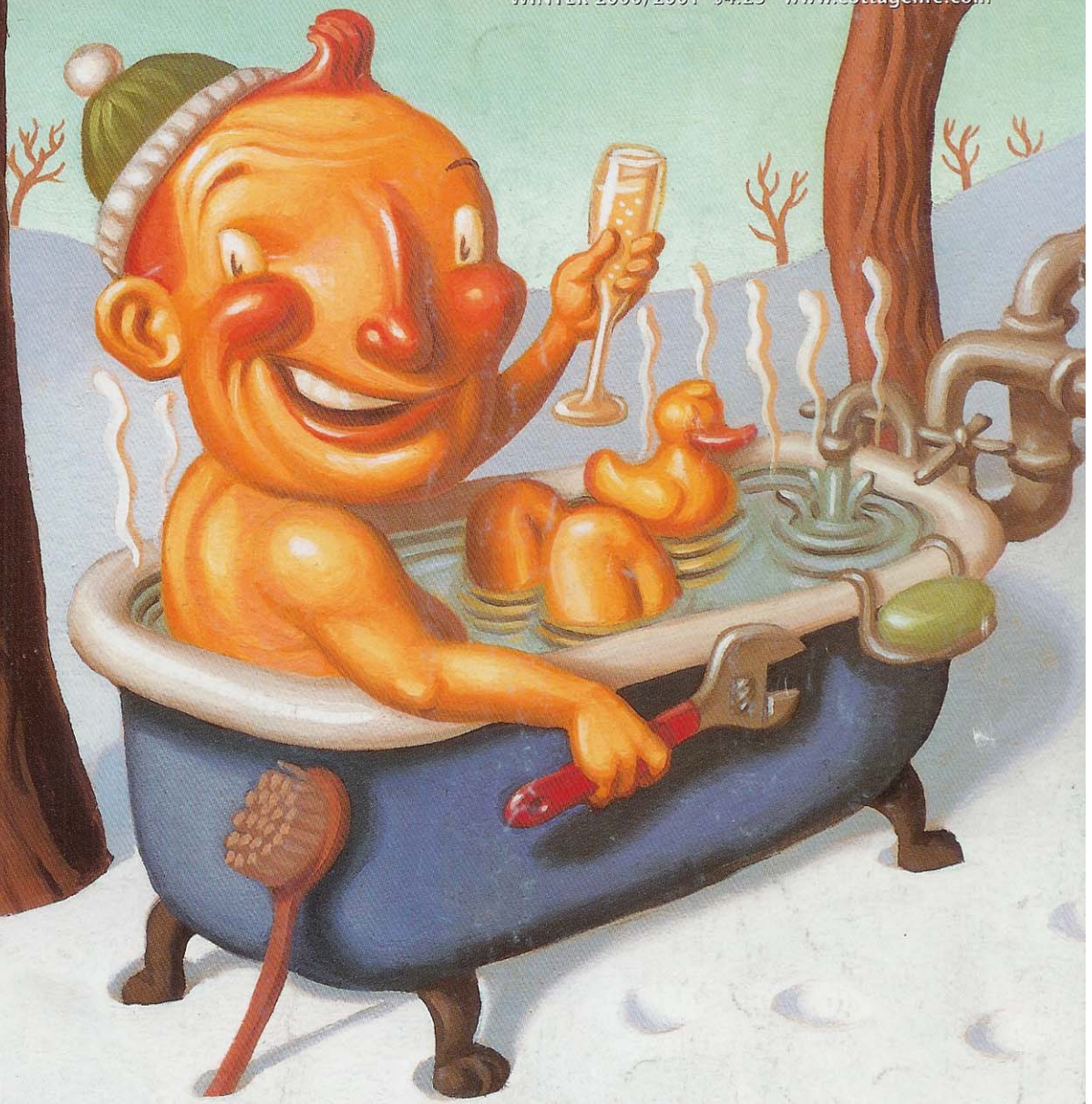

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WATER ON TAP

A COTTAGERS' GUIDE TO GETTING THE WET STUFF IN WINTER

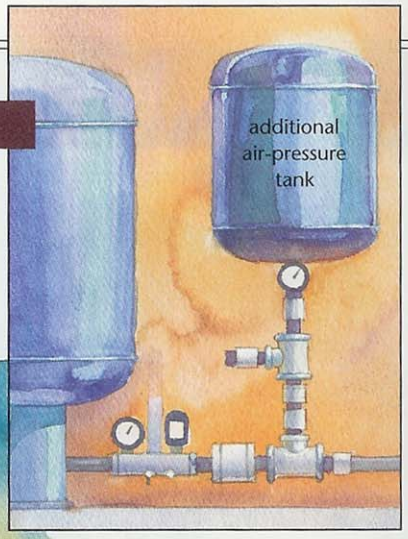
DRAIN-BACK SYSTEM: water leaves the line

COMMON DRAIN-BACK LAYOUT: The check valve at the top of the submersible pump is removed. When the pump shuts off, a check valve near the pressure tank keeps water in the cottage. At the same time, a two-way air bleeder opens, allowing the water to drain back to the lake. Heating cable is used where the supply line goes through the ice.

PUMP DETOUR: A diverter valve stops water from flowing back through the pump and spinning its motor and impellers backwards.

COMPRESSED-AIR DRAIN-BACK

Instead of heating the intake where it goes through the ice, this system uses compressed air to force the water further down the line below the ice. A weight on the air-filled line keeps it from floating to the surface (below).



[excerpt]

Drain-backs: that sinking feeling

While the buried pipe, insulation, and heating cable approach is the most common, the drain-back system is a practical solution for cottagers who have a long run to the lake, lots of exposed rock, and a decent slope.

The traditional reliance on heating cable "offended me from an efficiency point of view," says Malcolm Sexsmith, who installed a drain-back system at his Port Severn-area cottage in 1996. The Sexsmiths use the cottage as a weekend base for trips to a nearby ski hill, and the system has never failed to provide a good, hot shower after a day on the slopes. "It's really worked flawlessly," he says. "The only evidence that I'm not hooked up to city water is when I hear the check valve close on the system."

Drain-backs work by harnessing the power of gravity to drain the waterline before the water freezes inside it. "The important thing is the line has to be on a continuous slope," says Adam Soszka of Cottage Water Supply, a Toronto-based company specializing in self-draining water systems. Soszka recommends a slope that drops 8–10 metres for every 100 lineal metres. It's also got to be straight. "If you pour water through the pipe and hear it gurgling, there are dips in the pipe."

The most common drain-back layout starts by removing the check valve from the top of a submersible pump, then using the pump to deliver water as the pressurized system demands it. When the pump shuts off, a check valve near the pressure tank keeps water in the cottage. At the same time a two-way air bleeder opens, allowing the water in the pipe to drain to the lake.

It's important to remember that gravity alone won't force the water in the pipe to drain past the level of the lake surface. So while the empty section of the pipe will not freeze – and therefore requires no heating cable – the part that goes through the ice will. To prevent the pipe from freezing at lake level, Sexsmith uses a four-metre length of heating cable at the vulnerable point where the pipe goes through the ice.

A potential problem with the system is that when the pump shuts off, the escaping water spins the pump's motor and impellers backwards. Some pump manufacturers discourage running the pump backwards since it could cause premature wear. However, none of the plumbers we talked to had ever noticed a problem. More troublesome, the pump shaft could break if the pump starts up when the impellers are spinning backwards, although that's only apt to occur if the pressure tank is too small.

One way around these problems is to leave the check valve on the pump and drill a $\frac{1}{16}$" hole between the valve and the pipe's connection to the valve housing. As long as the hole doesn't get blocked, it allows water to drain, but also wastes some of the pump's effort when it's pumping. A newer approach is the system designed by Adam Soszka, which combines a patented two-way diverter valve and a pressure-reducing valve to drain the system without running water through the pump. Depending on the elevation between the pump and the water source, the system can be used in the standard mode during the summer by closing a ball valve in the air diverter.

Soszka, who developed his system to supply water to his cottage on Fairholme Lake, near Dunchurch, Ont., sells two types of drain-back kits – one incorporating heating cable, the other using a compressed-air system. The kits include waterlines, heating cable or air tank, valves, pump, and stand for about $1,700 (for a 100' line, excluding installation), depending on the size of the pump. Most of his customers select the heating cable version, but about 20 per cent opt for compressed air. Suitable for cottagers who have an alternative source of energy but no hydro, the compressed-air system collects the air in the pipe when the pump starts, stores it in a tank, and then uses it to push the water out of the line below the ice level when the pump shuts off.

Along with the obvious advantage of working without heating cable, air systems operate on shallower grades, sometimes with a drop as little as one or two metres for every 100 metres. The tradeoff is slightly higher maintenance. Because some air will be absorbed in the water, the system has to be periodically recharged by turning the pump on and forcing more air into the tank.