Cool your home with this simple device while you also meet your hot water needs

By Rev. J.D. Hooker

My first encounters with the possibilities of solar cooling came in the early 1970s shortly after my wife and I first married. For a few years we lived on Florida's swampy Gulf Coast. The winters there were great with temperatures that were never actually cold, and it rarely got hot. But the summers were a different animal—hot and humid, both with a capital H.

At least out-of-doors, you might catch a cooling breeze coming in off the Gulf. But once the ever-present mosquitoes (Florida's Gulf Coast is often referred to as the "Mosquito Coast") and other biting insects chased you back inside, if you didn't have air-conditioning, or at least a whole-house fan system, you just sweltered and suffered.

Several of the men I worked with, pouring concrete on construction sites, were outright "swamp rats." More than a few didn't have addresses or even any sort of roads leading back to their swamp-land homes. Their daily "commutes" to and from work included at least a couple of miles of travel by air-boat or out-board equipped canoe.

Though generally a pretty rugged and tough bunch, most of these men were pretty outgoing and friendly. Several invited us over to meet their families and to let me see how they'd adapted their own homes to temper Florida's intense summer heat.

All of their ingenious cooling systems were based on one very simple principal: that hotter air always rises, so heated air going out through the top of a flue must, therefore, draw cooler air in at its base.

Though I ran into several variations on this general theme, that same basic concept remained a constant with each individual cooling system they designed for their own homes.

The heart of these systems wasn't anything more elaborate than a large hollow chimney-like structure fashioned of wood, masonry, HVAC (heating, ventilating, and air-conditioning) leftovers, stuccoed palm blocks (a sort of cordwood masonry that consists of pieces of palm logs), or whatever was easily available. Near the top of the structure would be a large glazed window, often using Plexiglas or clear plastic sheeting rather than more expensive window glass. Opposite the window, the inside of this "chimney" was painted flat black and often this side of the structure's interior was lined with corrugated metal roofing to provide a little more heat absorbing surface area.

A large opening (or openings in some cases) near the bottom of the chimney-like structure formed an air inlet. As the black interior of this structure absorbed heat from the sun's rays, the temperature of the air inside increased. Once this heated air started rising upwards, exhausting through the chimney's top, air from inside of the dwelling would be drawn into the chimney through the bottom air inlet—which of course, would suck outdoor air into the house through the many doors and windows.

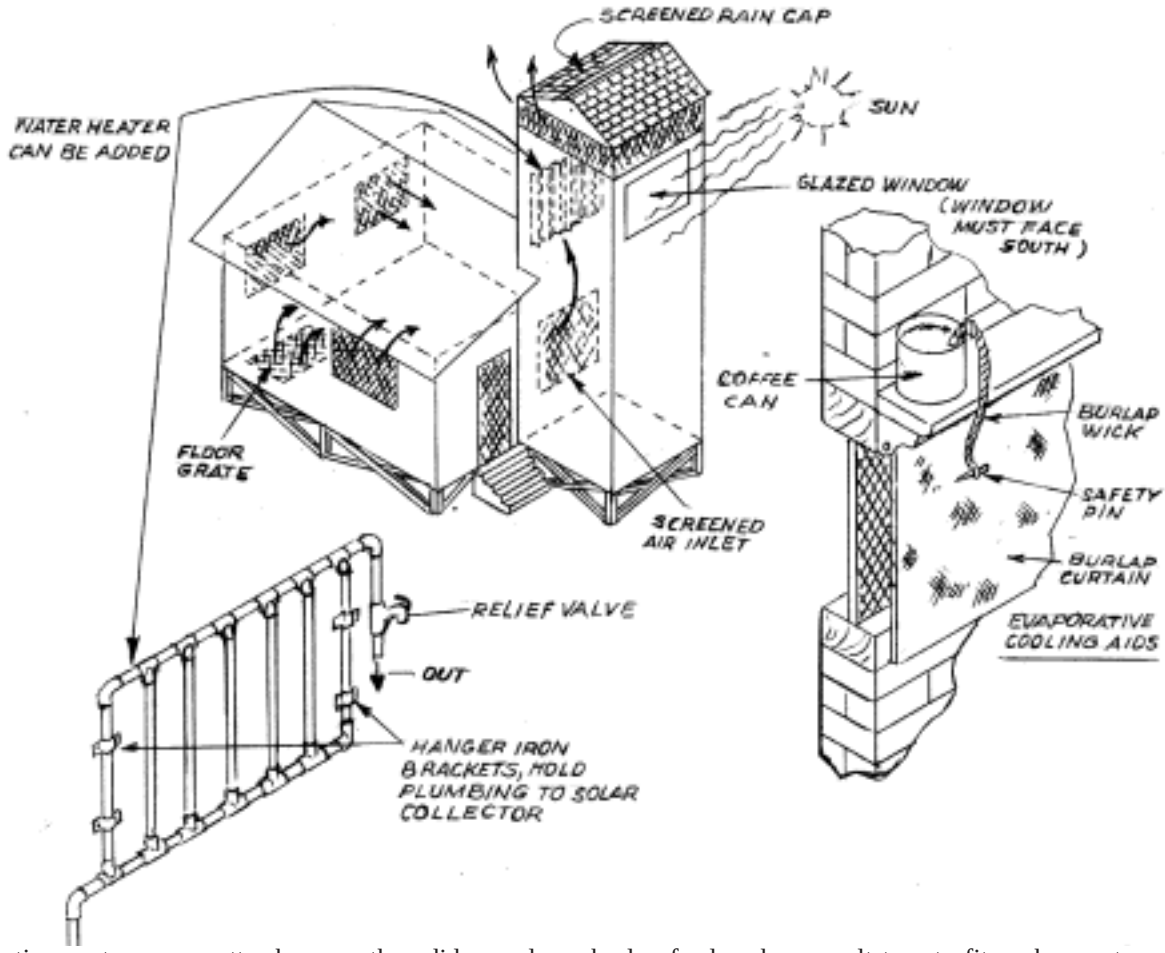
I should also mention that, in addition to having some sort of rain-cap atop the structure, each of these system also had every opening covered with fine mesh to prevent the ever-present insects from finding an easy way into the house.

All of the different parts of this system worked together to create a nice, sort of breezy, cooling effect which was remarkably similar to that of any electrically-powered whole-house fan system. Additionally many of these "backswamp homes," had been built up on stilts, off of the swampy ground. These usually had grate-like openings in their floors, allowing cooler air from the shaded area underneath the dwelling to be drawn into the cycle as well.

While several further improvements are readily adapted into this sort of system, the very first and most useful option I'd recommend would be installing the flat black "solar collector" to provide for your hot-water needs as well, especially since adding the heat-storing capacity of the water in such a system will increase the efficiency of the whole system anyway. The solar heat stored in the heated water is sufficient to keep the cooling draft and chimney effect working right on through the sunless nighttime hours.

Shown in the illustrations is one easy method for putting together a simple solar powered water heater for inclusion in this system. Using flat black painted plastic water pipe, in addition to the already black interior of the chimney, will increase even the daytime efficiency of the whole system a little while heating your water. By providing a somewhat faster air-exchange rate, a stronger, more cooling breeze will develop. However, black painted copper or galvanized water piping, or even dark colored garden hose, will work just about as well as the plastic pipe. So it should be easy to adapt your own ideas and available materials for use here.

I probably need to include a couple of short words of caution here. Even though many folks wouldn't think so, this or any solar water heating system can be just as prone to building up enough heat to cause an excessive build up of pressure, as can any other



water heating system, no matter how it's fueled. So, not including a relatively inexpensive pressure relief valve would just be like begging for trouble here. Also, while possibly unneeded in many tropical areas, in more temperate climates you'll need a means of draining and bypassing this system during the winter months.

Another valuable addition to the basic design is much simpler, and it's quickly put into practice. I first encountered this ingenious adaptation at the remote home of a long time friend who was a Vietnam War "tunnel rat" now turned Arizona desert rat. Along with his unofficial, immigrant "wife," he has raised a mess of unofficial kids (five boys, two girls, with no birth certificates, no hospital, immunization, dental, educational, police, or other records). All of them are as well adapted to their parched surroundings as any of the wild creatures sharing their desert domain. What they did was drape burlap feed sacks over all of the windows and doorways (covering the floor grates where applicable would also help) of his desert, dirt-hued, self-built rock and adobe dwelling. They set an old water-filled coffee can, pitcher, or other container on a shelf over each opening. They then attached a sort of burlap tail strip from the inside of the can to the burlap window covering where it was pinned. These tail strips act like wicks to keep the burlap curtains always damp, adding a constant evaporative cooling effect to the air drawn in through the doors and windows, and it kept the inside of his remote "owl-hoot" much more comfortable than I would ever have expected.

It also seems well worth pointing out that the more centrally you can locate such a system, the greater its effectiveness seems to be. But, while in many cases it might be pretty difficult to retrofit such a system right in the middle of your existing home, it's normally not very complex at all to center such a structure on one of the longer exterior walls.

Anyone considering including some sort of cooling system in their plans for any sort of a building should take a serious look at this type of solar cooling system. While this really can't approach the cooling effects of a standard electrically-powered central air-conditioning system, it can very readily equal the comfort level of any electrically-run whole-house fan system, without any monetary outlay for manufactured energy, and without any moving parts to break down or wear out. In fact, with only a little minor and occasional routine maintenance (repainting, recaulking, etc.) this type of system is capable of reliably providing free cooling and free hot water for at least a couple of lifetimes. Not a bad investment in my opinion. Δ