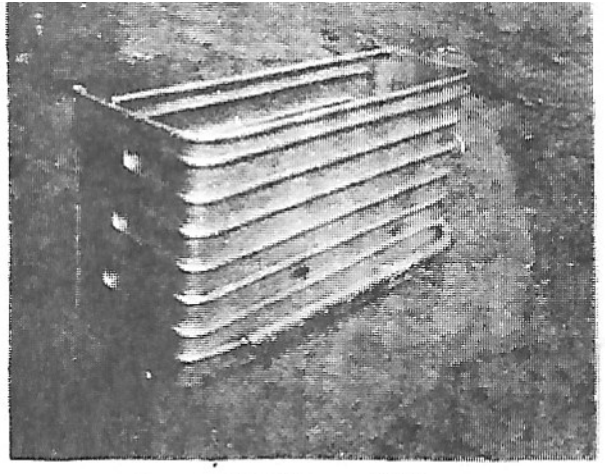


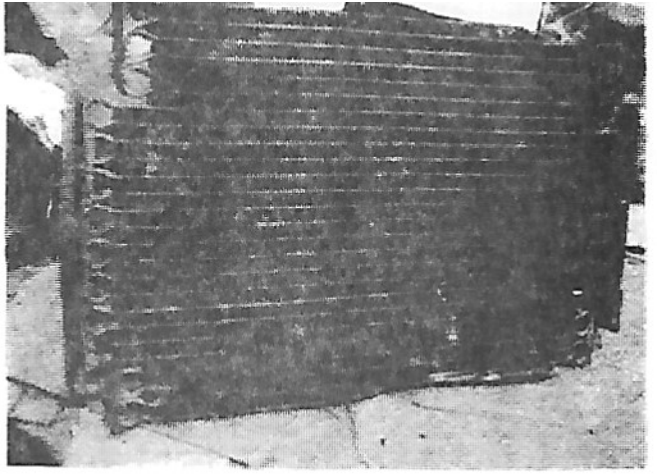
2. LIQUID - AIR

This heat exchanger is made by bonding together two steel sheets which have been specially formed so that flow channels remain after the two sides are together. Notice the large header with smaller flow channels leading from it. This particular exchanger is made of steel and used in refrigerators.

Both this exchanger and the previous one are the same configuration as photos #10, 11 which are solar heat collectors. The solar heat collector is not an air-liquid exchanger but instead a radiant energy to liquid exchanger. It is possible that these old refrigerator parts might be bent flat and used as solar collectors. The one I saw at the junkyard which had been straightened would not work because the flow channels had dimpled in when the sheet was flattened out.

3. LIQUID - AIR

This is an automobile air conditioner heat exchanger. It is all made of steel. There is no problem of rusting since the liquid that normally circulates through the tubes is freon. The fins that can be seen folded back and forth between the tubes are merely pressed in place and rely on a press fit for heat conduction. I once placed such a heat exchanger at the exit of a solar chimney. The heat exchanger was connected by tubing to a 10-gallon tank placed several feet above it. It heated the 10 gallons of water above 120 degrees. This is one fairly promising method of heating water in a region like New Mexico where you can't expose water in flat plate collectors because the water will freeze and rupture the tubing. A solar chimney forces hot air through a radiator during the day; at night the radiator, which has water in it, is sufficiently protected by heavy walls to prevent freezing. These radiators are very cheap at junkyards. I do not know how long they would last with water in them.

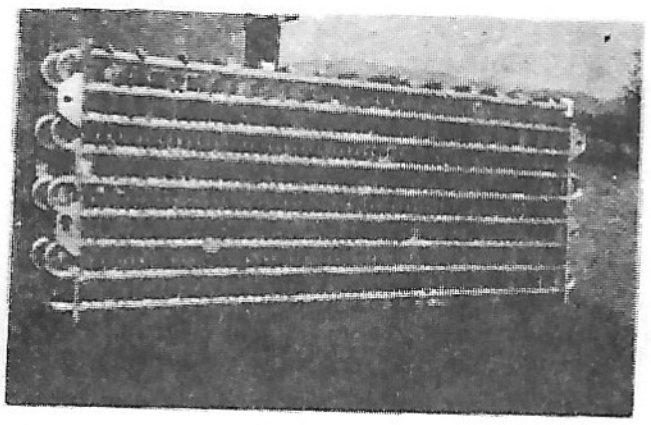


6 STEAM - AIR

This is a standard steam radiator of the kind that you find in numerous old buildings - it is made of cast iron. Steam enters at the top, condenses in the radiator and drains back to the boiler as water. These are kept very much hotter than the rooms they heat and much heat is given off, as their name indicates, by radiation. Why is the radiator painted white instead of black? Black surfaces are the best radiators. At the wave length at which these radiate heat they are not white but instead black. Most white paints are like this; white in visible light, grey or black in infrared. Aluminum paint remains shiny even in the infrared.

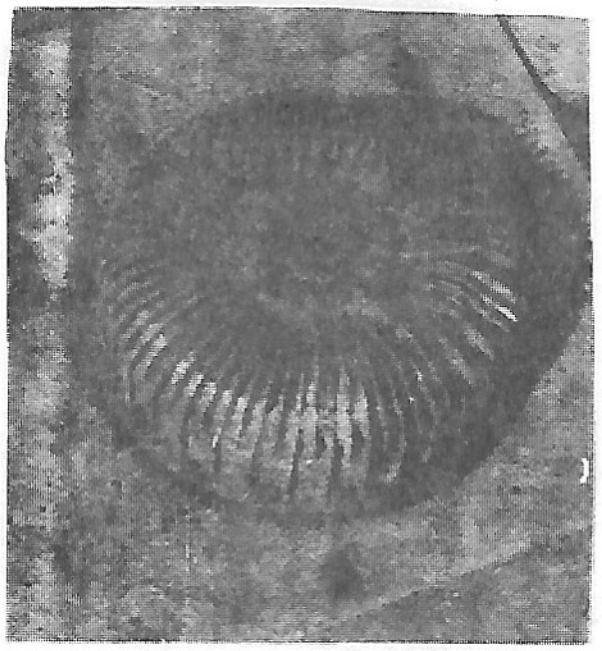
4. LIQUID - AIR

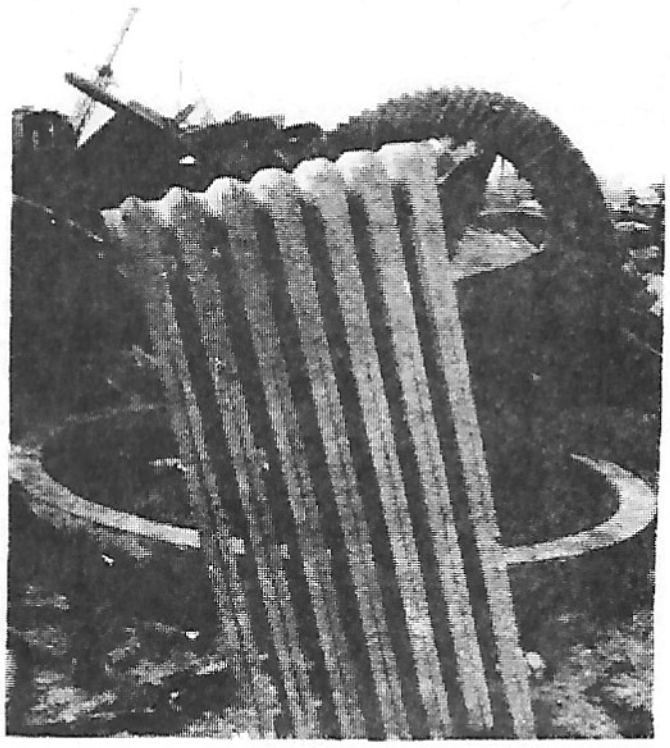
This is made entirely of aluminum; the fins are press fit in place. It is one continuous tube;you can see the front and back banks connected at the lower left.



5. LIQUID - AIR

The fins are to disipate heat to the air. You see similar arrangements on cylinder heads of motorcycle engines and on air compressors. Notice the gear teeth around this part - evidently it turned or something turned around it. Many such devices rely on convection to carry away the heated air but a fan or the motion of the engine itself as in a motorcycle greatly increases the rate of heat transfer. Convection can work effectively to move heated air if the air is confined to a chimney so that it can develop draft.





The Chapter on Heat Exchange will be completed in the next issue of the Tribal Messenger.