Hot Water System : Demonstration Apparatus.

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The drawing is almost self-explanatory. The boiler, B, is a 8x1-inch test tube, fitted with a two-hole rubber stopper. The radiator, R, is made from a similar test tube by holding the bottom of the tube in a flame until hot, and then blowing it out.

If the hole so made is enlarged while hot, by means of an iron rod, it may be fitted with a one-hole rubber stopper. The overflow, or expansion tank, T, is made from a three-inch funnel. The "Y" connection is a glass "Y." The heavy lines indicate pieces of rubber tubing. The valve, V, is an ordinary pinch-cock. The long tubes are $\frac{1}{4}$ -inch glass tubing.

DEMONSTRATION :

1. Filling the System—Add cold water to the tank. Water does not enter the system until valve is open. Why? Although the radiator is nearer the tank than is the boiler, the latter is filled first. Why? When the surface of the water reaches the top of the radiator, close the valve. The water should

then stand at the same level in the tank pipe as in the radiator.

2. Heating the System—Apply the Bunsen flame to the lower part of the boiler. Although the long tube is nearer the bottom than is the short tube, the water becomes hot first in the short tube. Why? The hot water moves up the top tube. Why does it move? The water rises into the tank. Why? Is there more water in the hot system than in the cold system? Bubbles of air collect in the top of the radiator. Where do they come from? If the air is not permitted to escape through the valve the radiator will not become hot. Why? If the water boils the steam will escape through the tank. How would a system without a tank act?

3. Cooling the System—Watch and explain all that happens. What would happen if the tank was very small?