hold your finger over the lower end of the tube, suck as much air as you can out of the tube, pinch the coupling, and remove your finger under water. Does the atmosphere drive water up the tube very rapidly and with great force?

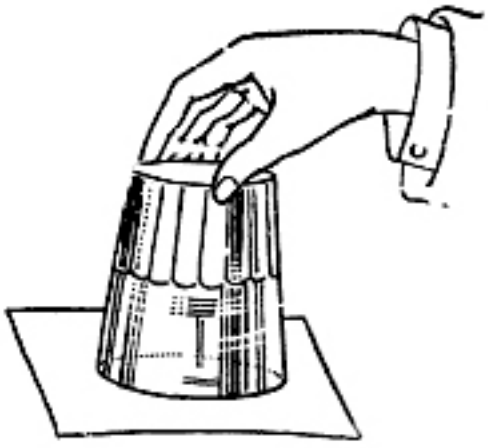

FIG. 100
MAGIC

Experiment 75. A fountain.

With the apparatus Fig. 99 suck as much air as you can out of the bottle, pinch the coupling, and open it under water. Does the atmosphere lift the water into the bottle and produce a beautiful fountain?

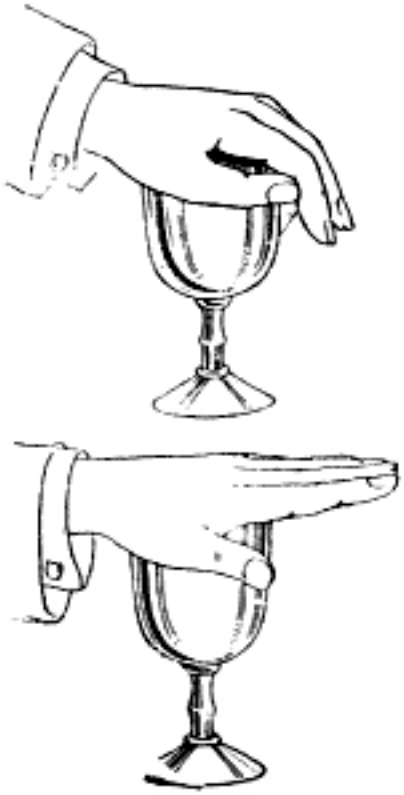

FIG. 101
MORE MAGIC

Experiment 76. Magic tumbler.

Fill a tumbler with water, cover it with a sheet of paper, hold the paper on with your hand, invert the tumbler, and remove your hand (Fig. 100). Does the atmospheric pressure upward support the paper and water?

Experiment 77. Magic lift.

Fill a tumbler with water, press your palm down on top with your fingers pointing downward (Fig. 101), straighten your fingers without admitting air to the tumbler, and then lift your hand. Do you lift the tumbler of water also?

There is a partial vacuum between your hand and the water and the

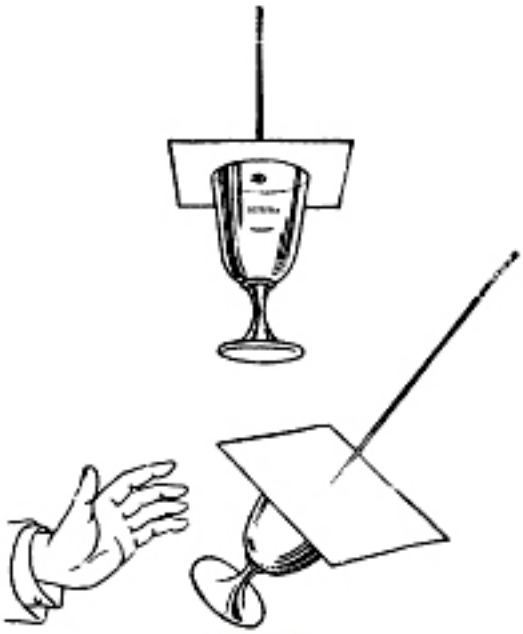

FIG. 102

TUMBLER PENDULUM

atmospheric pressure upward and downward holds your hand and the tumbler together.

Experiment 78. A magic pendulum.

Pass a string through a small hole in a piece of cardboard, knot the end of the string, and drop melted candle wax over the hole to make it air tight.

Fill a tumbler with water, press the cardboard down on the tumbler with the palm of your hand, and lift the string. Do you also lift the tumbler (Fig. 102)?

Swing the tumbler gently as a pendulum.

Experiment 79. A poultry fountain.

To make the poultry fountain (Fig. 103), fill a bottle with water, hold your thumb over the mouth, invert the bottle over the pan of water, and remove your thumb under water. Does the atmospheric pressure on the water in the pan hold the water in the bottle?

Lift the bottle until the mouth is a little above the water in the pan. Does air

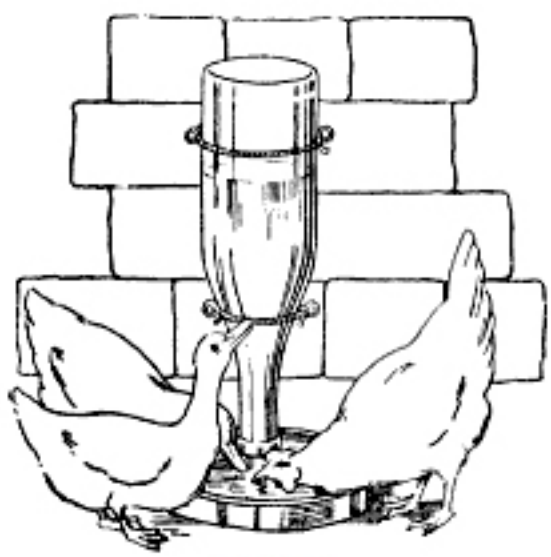

FIG. 103

POULTRY FOUNTAIN

enter and water run out until the mouth is again covered with water? This is what happens when the poultry, by drinking, lower the water below the mouth of the bottle.

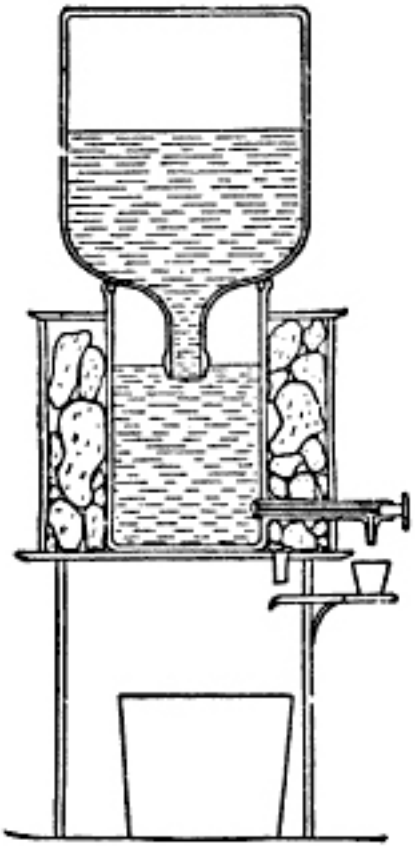

FIG. 104
A DRINKING FOUNTAIN

In a poultry fountain the bottle is supported, as shown, with its mouth under water but above the bottom.

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The drinking fountain (Fig. 104) is similar in principle to the poultry fountain of the last experiment. The water is held in the large inverted bottle by the atmospheric pressure on the water in the lower vessel. Air enters the bottle and water escapes from it when the level of the water in the lower vessel falls below

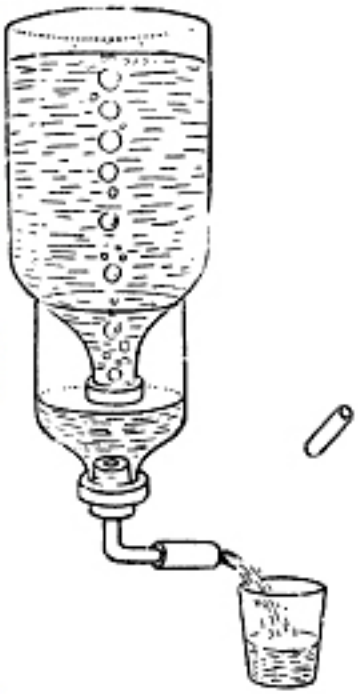

FIG. 105
HOMEMADE DRINKING FOUNTAIN

the mouth of the bottle. The water is cooled by the ice surrounding the lower vessel.

Make a drinking fountain of this kind as in Fig. 105, ask a friend to hold it, remove the glass plug from the coupling, and draw a glass of water. Do you observe that the air bubbles enter the inverted bottle and water flows from it only when the water level in the half bottle falls below the mouth of the inverted bottle?

Allow the water to flow continuously. Is the water level practically constant in the half bottle until the upper bottle is empty?