35 degrees below zero. Zone 4A. Exposure is important for many rhododendrons in many areas, but it becomes especially important on the fringes of the useful hardiness ranges. Other species of *Rhododendron* doing well in the warmer parts of the state are *R. mucronulatum* and *R. smirnowii.*

19. *Rhododendron maximum,* the *Rosebay Rhododendron* is native to Vermont and is found in one colony as far north as Troy, just a few miles from the Canadian border. It grows under a partial forest canopy, however, and when brought out into cultivation sometimes winterburns severely in exposed spots. If placed in protected spots, it does well in cultivation, but is not outstanding as an ornamental. Zone 4A.

HUGH STEAVENSON: Thank you Dr. Flint for that beautiful and informative talk. Unfortunately the next speaker shown on your program, Mr. Maurice Wilsey, could not be with us. But we have what I like to think of as a second generation Harvey Templeton, Mr. Werner Rexer.

## AQUA-VAPOR CONTROL

WERNER REXER
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Based on the principal of contraction and expansion of a special type of cordage, is the new misting and watering device, known as the Aqua-Vapor Control. The cordage in the wet stage, is approximately two percent shorter as compared when dry. (See Figure 1.) The control is equipped with a subminiature microswitch of one ounce release force, rated at a maximum of 5 amperes and 250 volts. It has a life expectancy of over ten million on-off operations and is completely enclosed in a waterproof housing. A plunger connected to the cordage actuates the microswitch through a diaphragm. (See Figure 2.). The total travel required is five one thousandths of a inch. The contraction and expansion of the cordage is one eighth of an inch when changing from a wet to a dry condition. This allows for variation caused by heat or cold, and makes the unit self adjustable. The control is hooked up directly to the curent of any type and to a solenoid valve, or a motor and pump. In the latter case, a relay is necessary.

The adjustments are made by placing the control in various locations from the mist nozzle, it is designed to range from 5 to 30 seconds on at any one time. The off or drying period is the same as that of the cuttings; in hot, dry surroundings with high light intensity it may operate as many as 40 times an hour, or as little as once every two or three hours on a rainy cool day, or at night. Further adjustments can be made by covering part or all but one of the holes of the perforated tube. This extends both the on and the drying period. One hole must remain open to receive the mist.

For hardening off, all the holes on top and the side away

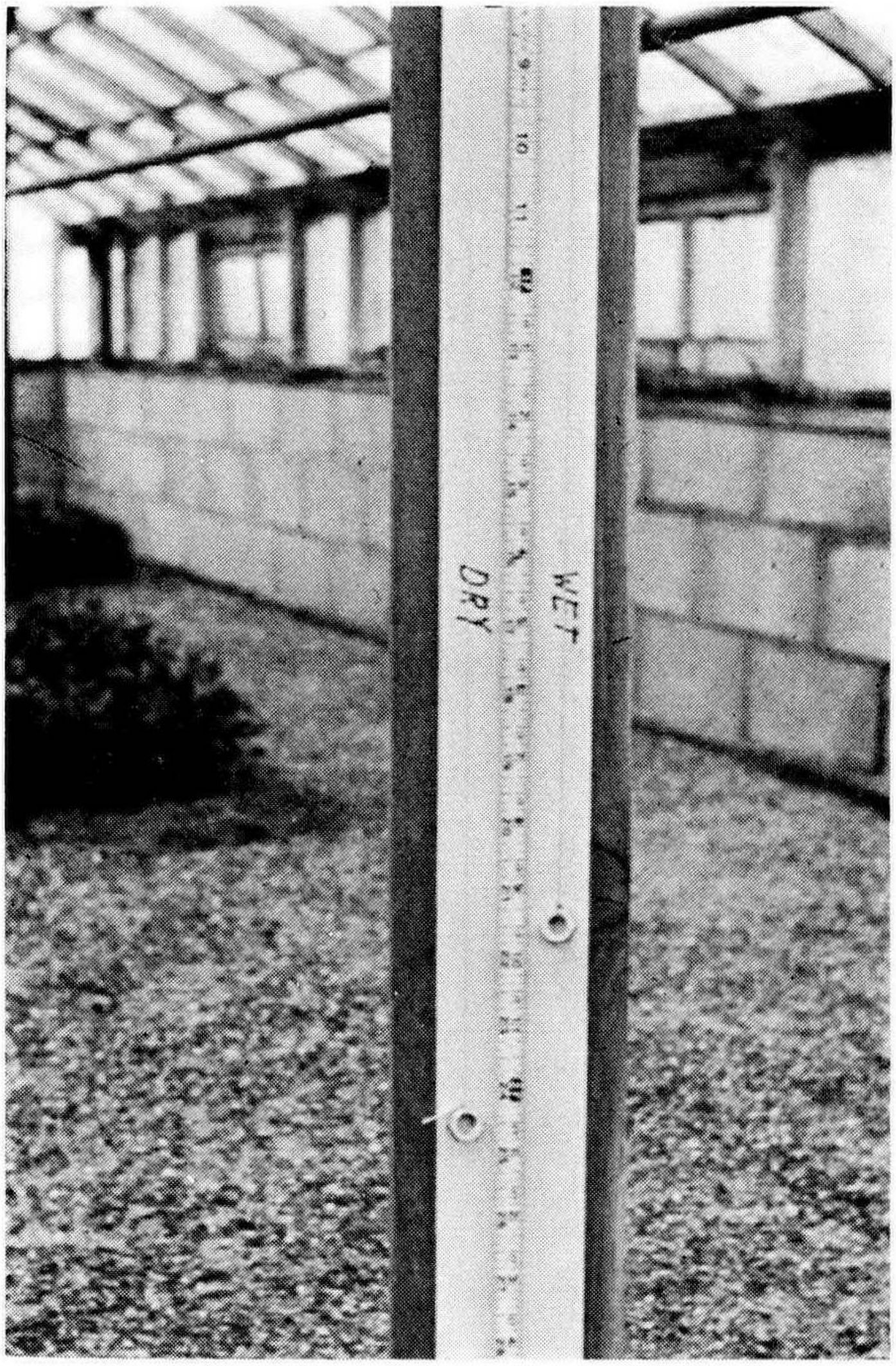


Figure 1. A demonstration of the effect of moisture on special cordage used in the aqua-vapor control.

from the mist nozzle are covered. The holes facing the mist nozzle are left open and this will greatly extend the period between mistings.

An additional sleeve, still in the developmental stage, will cover all of the holes of the perforated tube in such a way that it will be dustproof but will allow moisture to penetrate. Then the control unit can be buried at various depths in the soil for automatic irrigation.

I have considered every angle in the design, and construction of this control, so it can be used for every type of misting and irrigation. It also is designed many times stronger and safer than necessary. It has been under test since April 1966 and even the most primitively constructed unit has yet to fail. Theoretically it has a life expectancy of well over one hundred years when used continuously. The only maintenance

required is when dirty water is used or when heavy deposits of minerals cover the cordage. This, however, should be of no concern since the on and off periods will slowly extend, which would be noticeable a month in advance of failure. The deposits can be removed by dipping the control into a dry cleaning fluid or by sending it to the dry cleaner.

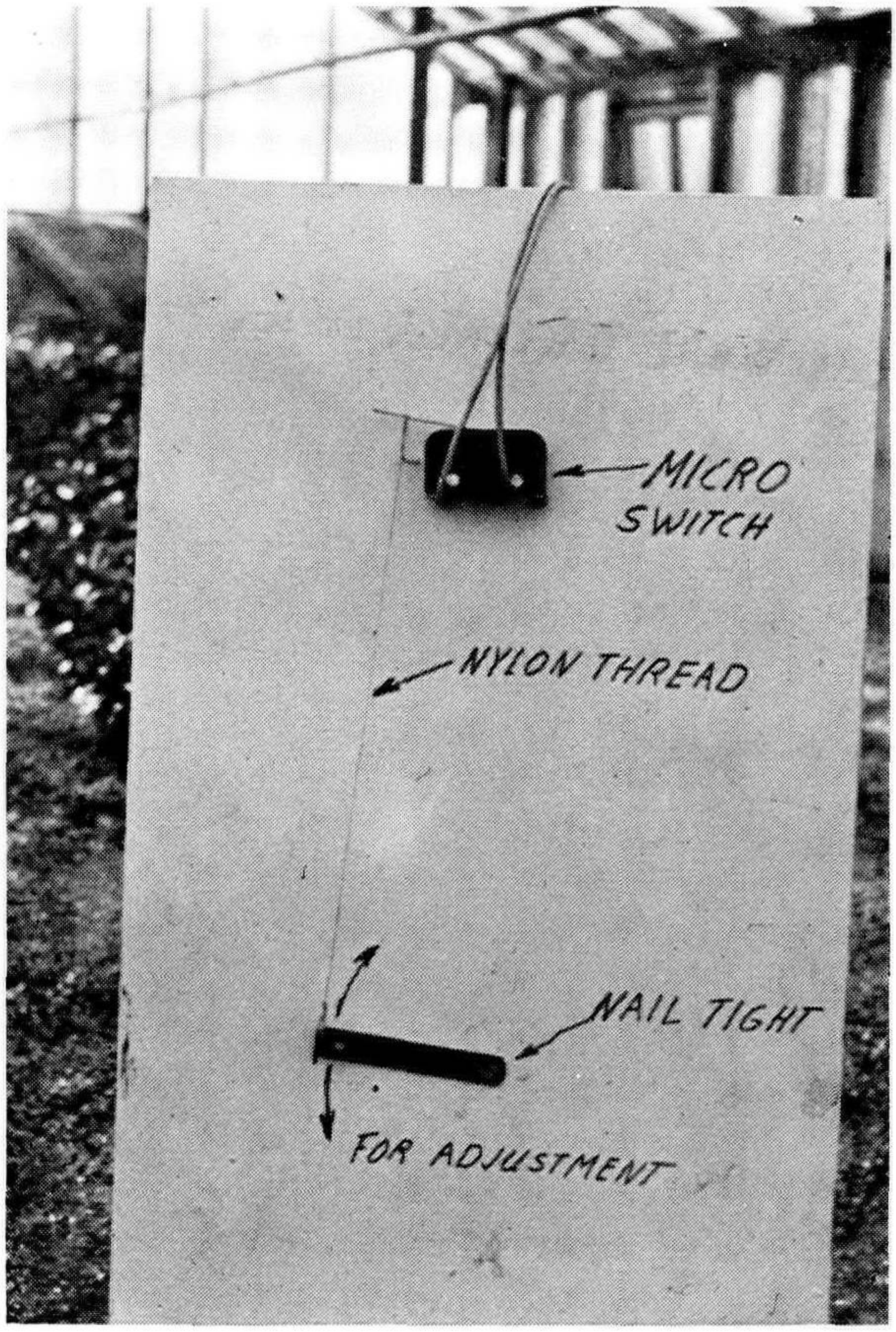


Figure 2. Principles of operation of aqua-vapor control.

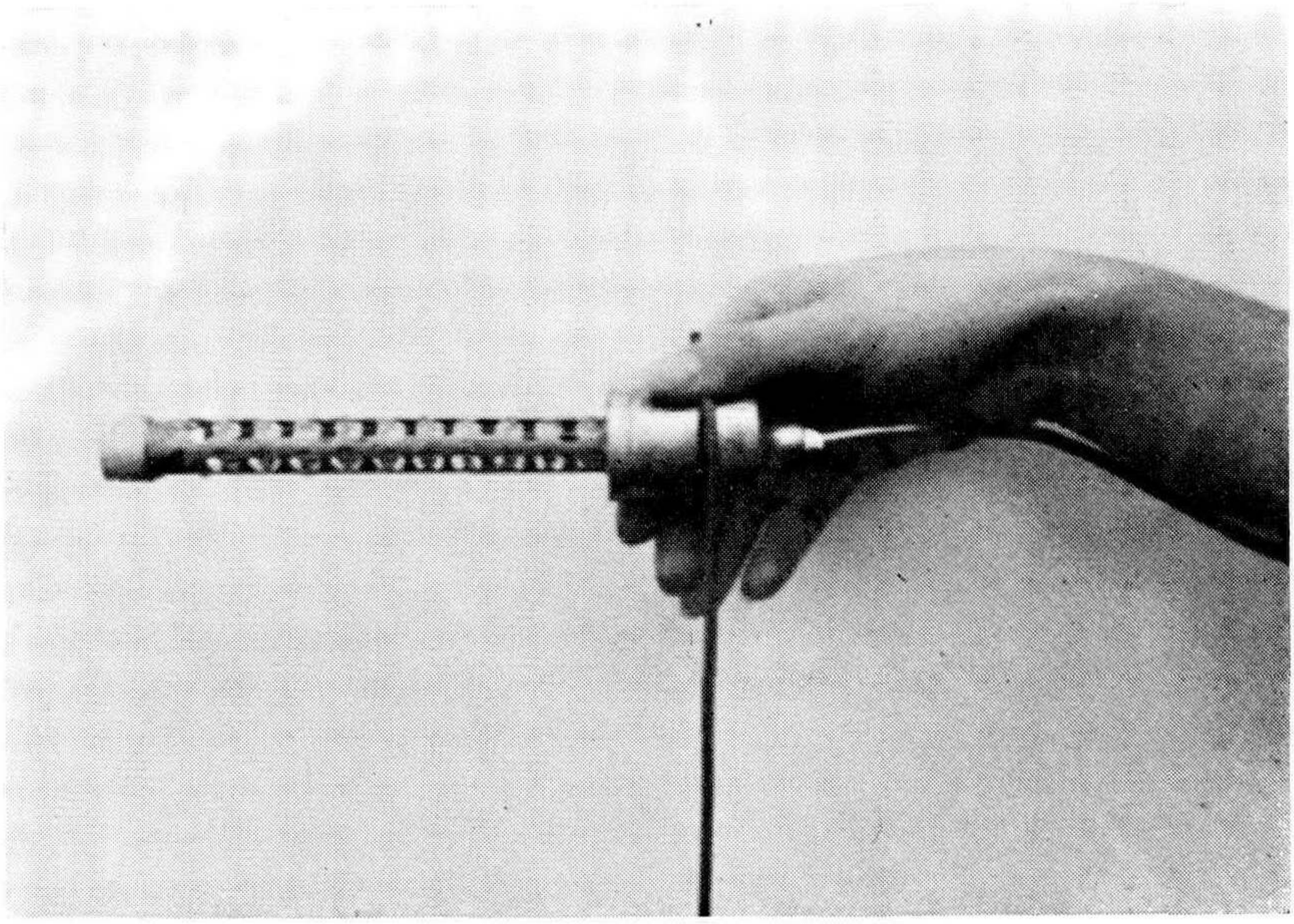

Figure 3. A finished model of the aqua-vapor control.

STU NELSON: Our next subject is one which stimulated much discussion last year — DMSO. To lead off the discussion this afternoon is Dr. Len Stoltz.

## EFFECT OF DIMETHYLSULFOXIDE(DMSO) AND TOBACCO SMOKE EXTRACT (TSE) ON ROOT INITIATION

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While working in Dr. Hess' lab I discovered that tobacco smoke blown into a piece of filter paper had a strong root initiating effect on mung beans which are used in the rooting bioassay developed by Hess (1). Later tobacco smoke extract which had been prepared by collecting the smoke in a cold trap from machines which automatically smoke the cigarettes was purchased and used. On the average 50 cigarettes yields 1 gram of tar.

In order to obtain an indication of the strength of the root initiation effect one gram of TSE was dissolved in 10 ml of methyl alcohol. A serial dilution was prapared by reducing to one-half the amount of TSE for seven dilutions; the last dilution contained 1/128 as much as the first. Twenty lambda of each extract was spotted on filter paper and tested using Hess' mung bean rooting bioassay. In this case 1 on