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Hydrostatics

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product. It is not easy to show with such small quantities of material that the starch has been changed to maltose.

If you wish to create a real interest in the study of insects, try the cockroach for a semester.

ROY L. ABBOTT

Note: Live roaches may be obtained from N. P. Frye and Son, St. Petersburg, Fla.

HYDROSTATICS (Concluded)

Physics

The classroom apparatus necessary for an effective, interesting presentation of hydrostatics includes: pressure tubes, manometer tubes, pressure syringe, Pascal's vases and equilibrium tubes. All of these are listed in the apparatus catalogs found in every high school. The total cost of such equipment need not exceed six or seven dollars. Some pieces can be made by the instructor. We use a pressure syringe made from the float of a toilet closet. Drill a number of small holes in the sphere, cut off the rod, solder on a tube six inches long and one inch in diameter, opening into the sphere. For a plunger wrap enough cord around a wooden rod to fit the cylinder tightly. As an interesting lecture demonstration of Pascal's principle completely fill a thin-walled bottle with water and insert a close-fitting stopper. A sharp downward blow upon the stopper will completely shatter the bottle.

The instructor should avail himself of every opportunity to enliven the subject of Hydrostatics by discussing the various devices in which the principles are practically applied. These would include the hydraulic press, hydraulic jacks, hydraulic brakes of an automobile, barber's chair, city water distributing systems, devices used to neutralize the pressure on divers, and those used on engineering projects to enable men to work in caissons subjected to water pressure.

He may also profitably discuss the principles and applications of pressure of flowing liquids. Take up Bernoulli's principle as illustrated in the common laboratory filter pump and also in the curving of a pitched ball. The principle of Torricelli, which deals with the flow of a liquid from an orifice when subjected to gravity

pressure, may be studied. Some years ago the writer was consulted by a group of men as to whether the doubling of the height of the city water tank would double the flow of the water from a faucet. When he stated that, theoretically, the tank would have to be four times as high to double the flow, the group were almost incredulous. The writer doubts that in the minds of those men, this statement added to his reputation as a teacher of physics.

L. BEGEMAN

WINTER STUDY OF TREES

Botany

One often hears the idea expressed that there is little to be done during the winter months in the way of field or laboratory studies of trees. In reality there is a wealth of material available and the following suggestions are offered in the hope that they will be helpful in calling attention to the possibilities of winter tree study.

The annual shedding of leaves by our deciduous trees is familiar to all but the importance of this phenomenon is not always recognized. The twigs of trees common to your locality can be collected, or studied in the field if the weather permits. Attention should be directed to the corky covering of the twigs and to the dry, waterproof covering of the buds. The scars left by the dropping of the leaves are also covered by a corky tissue known as the abscission layer, which caused the severing of the leaf from the twig. The tree which during the summer showed a high evaporation rate due to its enormous leaf surface, now exposes a much smaller surface that is protected by corky tissue through which the escape of water is difficult. The importance of this protection is realized when we think of the frozen condition of the soil. The waterproof nature of bud scales is readily illustrated by buds of Boxelder, Cottonwood, Shagbark Hickory and Horse Chestnut. It is instructive to note that leaves were borne only on the portion of the twigs produced during the last season and also to notice the position of the buds with reference to the leaf scars.

It is interesting to compare the winter condition of deciduous trees