the height of the dam as it now exists, and it is thirteen feet from the bottom of the ditch to the top of the dam.

The land that has been reclaimed from the swamp is a black vegetable mould that is very productive. Several wells have been made in the reclaimed land that furnish a strong flow of sulphur water, at a depth of four to six feet, out of a pure white sand. The soil is very porous, where it seems perfectly dry, water will soon fill your tracks, and the furrows made by the plow fill with water by the time the farmer can make a second round.

In traveling along the roads the existence of former swamps are very plainly seen. The soil is a grayish or white clay. The decayed vegetable matter in the swamps made a black soil which contrasts strongly with the white clay. Some farms are, however, all black soil. The amount of this soil always determines the value of the land.

The big swamp of late years has completely dried during the long continued droughts, as to the surface appearances, but a stick stuck in the soft loose soil comes out wet, and the hole soon fills with water. The old settlers say that numerous fish could be taken from it during the spring months, when there was plenty of water, and that a tall coarse grass covered it entire during the summer. In the fall, when the grass was dead, it was often fired, when it would burn for weeks at a time, burning great holes in the ground about the edges of the swamp. This swamp is undoubtedly of glacial origin, and formerly extended over more or less of Bath Township. It has been the home of the beaver. It is underlaid with pure white sand and furnishes abundance of sulphur water. Man has labored for seventy years to redeem it, and has almost conquered, making the wilderness blossom as the rose.

WATER CULTURE METHODS WITH INDIGENOUS PLANTS. BY D. T. MACDOUGAL.

During the course of some extended experiments relative to the general nature and functions of the tuberous formations on the roots of Isopyrum it was found impossible to secure a normal development of this hardy plant in pots with customary greenhouse temperature. An examination of the habit of the plant reveals the fact that it starts into active growth at the close of the winter season, when the soil is scarcely above the freezing point, and by the aid of a few days of warm sunshine accomplishes its yearly growth, during a period when the difference between the soil and air temperature is greatest. The amount of such difference between the soil of a northern hillside and the air in April and May, the growing period of the plant, is very great in this latitude, 45°. With such facts in hand

it was easily interpreted that the discoloration and loss of leaf by the plants in the greenhouse was the direct effect of an abnormal absorption of water induced by the unaccustomed high temperature acquired by the small quantities of soil in the pots. The attempt was made to give the plant more nearly the normal conditions of temperature, and at the same time grow it in culture solutions. Since it is found in very moist localities the latter condition offered no violent changes to the habits of the plant. Ordinary culture jars of a capacity of one liter, provided with zinc tops, were used. The diageotropic rhizomes were imbedded in asbestos fibre in a sunken chamber in the zinc tops in such manner that the fibrous roots depended into the fluid beneath. The jars were set their full depth in a roomy box full of porous soil. By means of a constant drip from a water tap the earth was kept saturated, and by reason of the initial low temperature of the water and the rapid evaporation the fluid substance was kept quite cool. So nearly does this meet the natural conditions of the plant that specimens several years old were lifted from the soil in the woods and successfully grown by this method. The writer now has several plants which have been under such treatment during a period of nine weeks. They are of normal size and stature, and at this date (December 18) exhibit a number of flowers, opening buds and maturing seeds, while the development of the roots can be followed with the greatest ease. This method has been used by students in water culture experiments with the cultivated plants very successfully, and by its use it has been found possible to bring under continuous observation during the winter season several species of hardy native plants. In investigations on material of this kind it is believed it will prove valuable.

Work Shelves for Laboratory. By Katherine E. Golden.

These are shelves which were constructed in such a manner as to do away with all vibrations from the floor and walls. This object was attained by the use of iron pipe. Round holes were cut through the floor, through which were driven two iron pipes, two and one-half inches diameter, into the ground beneath to a depth of about three feet. If the ground were very firm, a lesser depth would do. The pipes were left a convenient height above the floor. Heavy planks had holes bored in the two ends, through which the pipes fitted closely, the planks being held firmly in position by means of clamps placed beneath them. By means of the clamps the height of the shelves can be varied at any time to suit one's convenience. This kind of shelf is preferable to that which is suspended from the walls of a building, as the latter vibrates with the building.