one-fourth per cent. solution for the same length of time the seed was seriously affected.

Bolley[9] reports the effects of formalin on oats, barley and wheat. Seed of oats and barley immersed half an hour in a solution containing three parts formalin to one thousand parts of water gave normal germination nine days and nine months after treatment. Wheat immersed ten minutes in a two per cent. solution gave eighty-two per cent. germination.

Thomas[10] finds a one-half per cent. solution for oats and a treatment of about two hours produces no injury to the seed.

For wheat a one-fourth to one-half per cent. solution and an immersion of one-half hour is recommended. Rye was injured in a one-fourth per cent. solution when immersed but an hour.

SUMMARY.

A brief resumé of the data presented shows that the results obtained in the treatment of the spores are well within the bounds of successful practice.

The spores are much more easily injured either with hot water or formalin than is the grain.

It is apparent that the essential feature in the successful treatment of grain for smut is to bring each seed in contact with the solution used a sufficient length of time to enable it to reach the smut spores.

The advantage possessed by formalin over hot water in the treatment of seed grain lies in the greater ease of its application, doing away with the necessity of heating water and maintaining a reasonably uniform temperature during the period of treatment.

Lake Maxinkuckee. By J. T. Scovell.

During the summer of 1898 I traced out the sandbars in the southern portion of the lake. In doing this work I made about 100 soundings. In all we now have about 900 recorded soundings of the lake. The contour

[9] *l. c.*, 130-132.

[10] Thomas, Proc. Ind. Acad. Sc., 148, 1897.

lines drawn from these soundings give a fairly correct idea of the topography of the lake bed.

Almost every sounding in five feet of water showed a bottom of hard sand or gravel, while almost every sounding in water ten feet deep indicated a bottom of fine mud, usually marl, from eight to twenty feet or more deep. In water more than thirty feet deep the mud is finer and darker, but I could get no idea of its depth. The hard bottom is much wider on the east side of the lake. It may be that the westerly winds give rise to an undercurrent which sweeps the finer material into the deeper water. But the same phenomenon occurs on the bars in the central portions of the lake where the wind would hardly cause currents. A few observations of the temperature of the water in the lake at different times of the day showed considerable variation and might cause currents. July 28th, at 7 a. m., the temperature in water about eighteen inches deep was 78 degrees Fahr., at 2 p. m. it was 84 degrees and at 8 p. m. 82 degrees; July 29th, at 7 a. m., 77 degrees, at 2 p. m., 87 degrees, at 8 p. m., 80 degrees; July 30th, at 7 a. m., it was 74 degrees, at 2 p. m., 82 degrees, at 8 p. m., 78 degrees; July 31st, at 7 a. m., 75 degrees, at 2 p. m., 84 degrees, at 8 p. m., 80 degrees; August 1st, at 7 a. m., 76 degrees, at 2 p. m., 82 degrees, at 8 p. m., 79 degrees; August 5th, at 7 a. m., 79 degrees, at 2 p. m., 82 degrees, at 8 p. m., 80 degrees; August 6th, at 7 a. m., 75 degrees, at 2 p. m., 80 degrees, at 8 p. m., 78 degrees. Whether changes of temperature ranging from five to ten degrees within twenty-four hours would cause currents strong enough to move fine sediment I cannot tell, but the idea is suggestive, and investigation along this line may show interesting results.

The lake shows considerable variations in level. Elevations taken by the Vandalia people at different dates in 1895, 1896, 1897 and 1898 show a variation from 733.3 to 735.17 feet, about 1.87 feet. In August, 1896, I saw a rise of six inches as the result of two days' rain.

I added over 100 species to my list of plants and trees found about the lake, extending it to about 290 species. We have a list of thirty-one species of fish found in the lake. Six species of bivalve mollusks and three or four species of univalves have been identified, and I think five species of turtles are found about the lake.