about three thirty-seconds of an inch bore, "drawn" enough in one place to make the water level appreciably above D at slow rates of drop. A jar seven or eight inches high and three or four inches wide will be plenty large enough for T, and V need not be so tall.

I have made a number of record tests of the time accuracy of the drop, and find that it is perfectly reliable for one second to one eighth second, as shown by comparison with a 256-vibration fork. The drop will run much faster than one tenth second, if the size is properly controlled by the means mentioned above, but my key is too clumsy to record well much beyond one eighth. With a slight change in the key that difficulty will be obviated. From one second to six seconds my first records showed an apparent variation. These records for the longer periods were not intended to be extremely close, and were taken with a Zimmermann chronograph. I found later that the variation was in the chronograph, and have not yet tested these intervals with the tuning fork. Compared with a pendulum record, they appear perfectly regular. Intervals longer than six seconds I have not employed at all, although the apparatus is capable of furnishing them.

This device may be put to a variety of uses about a psychological laboratory. In addition to work in rhythm, I find it useful for time-records on the kymograph, for intermittent stimulation in work in fluctuation of attention, and for a time guide for an experimenter in the employment of definite intervals of preparation for a stimulus or between successive steps of an experiment. The key may be adjusted to give a regularity of current strength far greater than that of even mercury contacts of other time machines, making the apparatus especially valuable where this condition is of great importance, as in the rhythm and attention experiments.

Knight Dunlap
Johns Hopkins University

On Quinine Sulphate and Human Blood

Quinine sulphate when administered in small doses to healthy students has been found generally to slightly increase the phagocytic action of the polymorphous mentrophiles but in some cases it slightly inhibits.

In vitro an inhibitory effect, together with some laking was found when the strength of the sulphate ranged from 1/1,000 to 1/15,000 while from 1/16,000 to 1/1,000,000 dilution there was increased phagocytosis in periods ranging from 30 to 60 minutes, being most marked at a strength of 1/75,000. There was noted in all suspensions, which contained more than 1/20,000 of quinine sulphate, a marked absence of the granules from the polymorphous neutrophiles. The cell membrane was often gone. Vacuoles were very frequently present. As contrasted with those in the unquinized specimens their cytoplasm showed diminished staining powers which was strong evidence of the destructive action favored by the quinine.

A simple method requiring only a few hours for its accomplishment has also been worked out for studying in vitro the effect of any drug on opsonic index and in connection with the latter subject a means of standardizing the virulency of any organism has been suggested.

Thos. M. Wilson
Hull Physiological Laboratory,
University of Chicago

Botanical Notes

Farm Botany

For botanists who may wish to learn something more about wheat, oats, barley and corn (maize) than is to be found in the ordinary botanical works, the little book, "Examining and Grading Grains" (Ginn), by Professors Lyon and Montgomery will be found useful. Many a botanist will be surprised at the number of things which may be seen in a careful study of these common plants. For classes in applied botany in agricultural schools and colleges it must prove very helpful.

Fossil Iowa Plants

Professor Macbride's paper on "Certain Fossil Plant Remains in the Iowa Herbar-