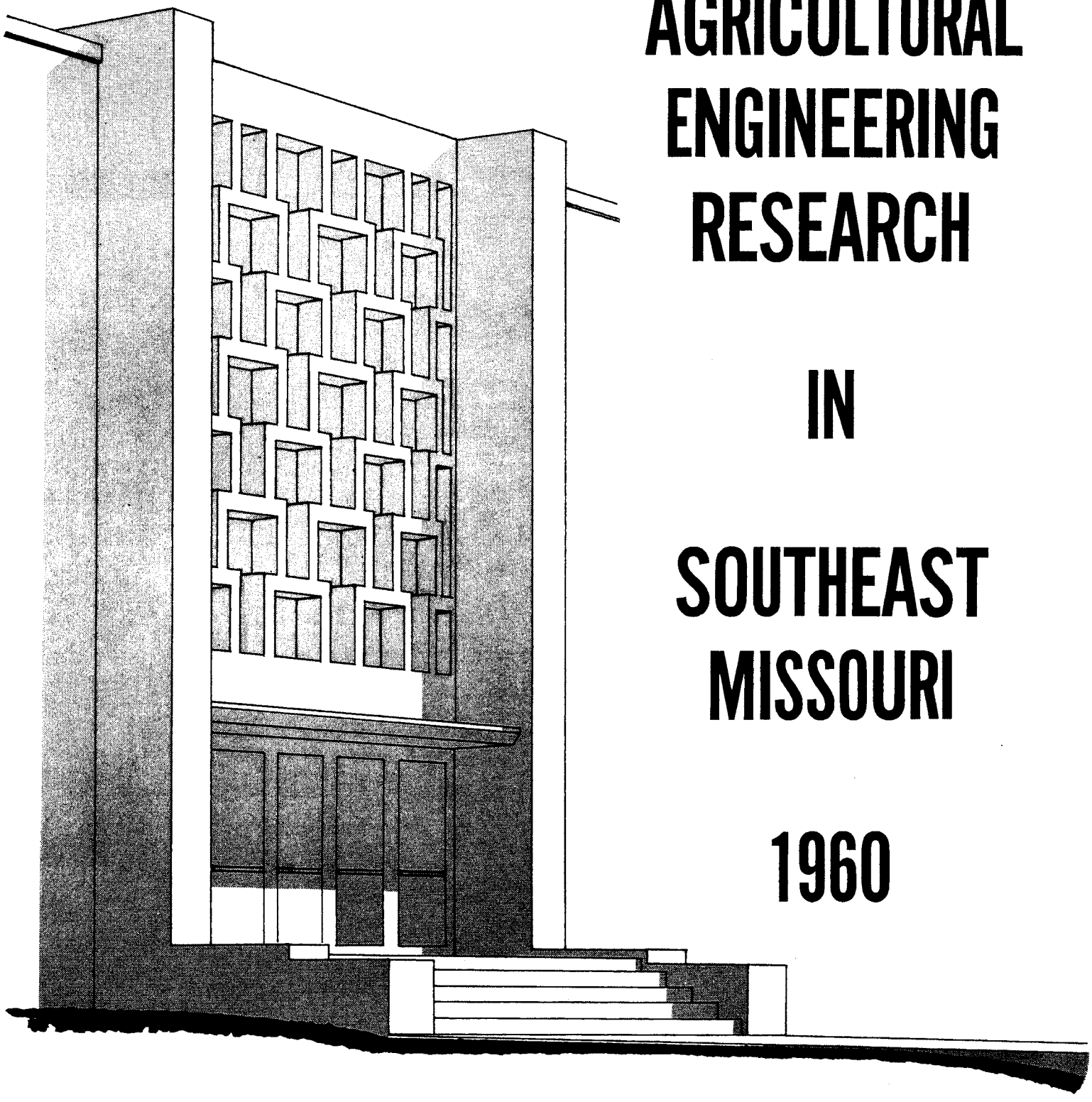

AGRICULTURAL ENGINEERING RESEARCH IN SOUTHEAST MISSOURI 1960

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE COLUMBIA, MISSOURI

AGRICULTURAL EXPERIMENT STATION

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AGRICULTURAL ENGINEERING

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Seepage Study

The probably influence of high river stages on seepage was studied on the Southeast Missouri Research Center farm east of Portageville.

Topographic and soil surveys were made, and ground water elevations were checked in the vicinity of the farm for several months. Interviews with residents of the neighborhood established seepage history during past prolonged high river stages. Probable frequencies of high water stages were determined from U. S. Corps of Engineers stage records for the New Madrid gage. Piezometers were installed at a number of locations to measure the elevation of the water table at various times.

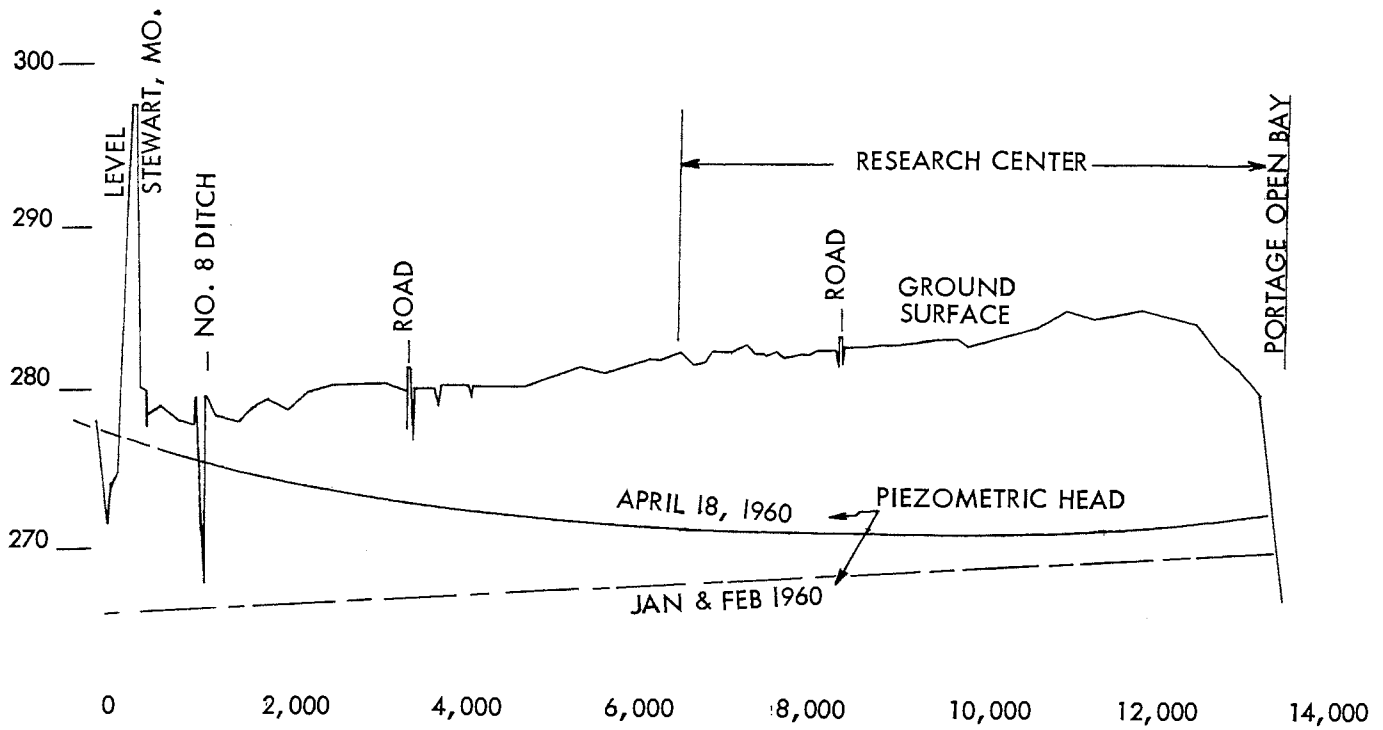

Figure 1 shows the ground profile from the Mississippi River levee near Stewart, northward to Portage Open Bay along the east side of T and TT roads. Lines denoting the piezometric head as determined by piezometers at 25 to 30 foot depth below the surface are drawn for the January-February, 1960, period and for the peak following the high water of April, 1960. The maximum height of river stage at Stewart occurred April 15 at an elevation of 280.9 feet.

A piezometer installed at the toe of the levee rose to 276.6 feet by April 18, while 6 piezometers around the sides of the University farm indicated heads of 271.4 to 272.3; also peaking on April 18.

The farm was divided into three areas for this study. These areas were (1) the west half, a sandy loam ridge at about 282.5 MSL mean elevation; (2) the east half, a "gumbo" area of varying elevation approximately 277.5 MSL mean elevation; and (3) a low part of the east half of about 60 acres at about 275.0 MSL mean elevation.

This study indicates that high river stages should have relatively little adverse effect on planting and cultivation of crops in the western half of the research farm. Some difficulty may be expected every 5 to 10 years with crop planting and cultivation in the higher part of the eastern half of the farm. Troublesome ground water elevations may be expected fairly frequently on about 60 acres in the lower portion of the eastern half of the farm.

The analyses and estimates above do not take into account perched water table conditions which may result from excessive rainfall and the known existence of a more impermeable stratum of clayey soil underlying the upper loam in the western half of the farm. (Project 423)

Ponding Test

The ponding test on Sharkey clay at Bragg City which was initiated in 1959 was repeated this year. Treatments consisted of ponding water on plots for periods of two, four, or six days at three stages of growth: four to six leaf stage, first bloom, or at first open boll. Six replications of Dixie King were planted. Yields were highly variable and differences were not statistically significant. However, average yields indicated early season ponding (four to six leaf stage) reduced yields for all three periods of time while late season ponding (August) increased yields. The previous year's test showed the same trend. (Project 423)

Irrigation Test

The experiment's design called for a continuation of the test conducted in 1958 and 1959 at Bragg City using a short season variety, Rex, and a medium to long season variety, Delfos. Adverse weather at planting time resulted in almost complete loss of stand, and the block was planted to Dixie King when replanted.

Irrigation treatments were alternate versus every row irrigation with a "wet" and "wilt" scheduling. The "wet" treatment was irrigated July 14 and 28, August 5 and 16. The "wilt" treatment was irrigated August 1 and 16.

Fields of individual plots were highly variable, with both the highest and lowest yields being obtained on non-irrigated check plots. The second highest yield was obtained on an alternate row, "wet" treatment. This same treatment also produced the highest average yield. Yield differences were not statistically significant and therefore are not reported here. (Project 395)