MICHIGAN AGRICULTURAL COLLEGE EXPERIMENT STATION

PRESS BULLETIN NO 47

To the Editor:

The notice below will be of value to many of your readers. We, therefore, ask you to cooperate with us in calling attention to this timely matter.

R. S. SHAW,
Director.

Darability of Concrete Drain Tile.

For several years, reports of the disintegration of concrete tile have been coming to the Experiment Station. The causes of the disintegration have been variously ascribed to many different factors, and the opinion has become quite general that concrete drain tile are not durable when laid in muck soils. Because of the lack of definite information on this subject the Division of Chemistry and Farm Mechanics of the Experiment Station undertook an investigation of the problem. A number of farms where failure with concrete tile had been reported were visited and the drains examined. Tile, in various stages of disintegration were found in practically all types of soil and in every drainage system examined sound tile as well as disintegrated ones were found. This indicated that neither the soil nor the soil solution could be the primary cause of the trouble.

Upon gathering information in regard to the manufacture of the tile used in the drains it was at once evident that they had been made under widely varying conditions and that, in some cases, the tile had been laid very soon after being made and before the hardening process was complete.

After securing considerable data from field observations a number of laboratory experiments in making tile, and subjecting them to the action of various solutions were carried on. The evidence obtained from these experiments and observations points to the inevitable conclusion that the primary cause of the disintegration is in the making. On this point too much emphasis cannot be laid.

The materials used and the various steps in the process of manufacture require careful attention. Any standard portland cement, if properly stored, is satisfactory. The sand and gravel should be clean and free from clay or organic matter. For tile up to ten inches in diameter the gravel should contain no particles larger than that passing a ¼ inch screen. The sand and gravel should be graded so that when mixed with the cement there will be just enough fine material to fill all the air spaces. The proportion of one sack of cement to three cubic feet of gravel is recommended. Just enough water should be used so that after forming the casings may be removed at once.

The tile should show trowel marks on the inner surface and web-like markings on the outer surface and they should be uniformly packed so as to insure a dense tile wall. A porus tile wall should be avoided since the passage of the soil water through the tile wall will gradually dissolve some of the cementing material. Finally special attention must be given to the curing or hardening process by supplying moisture at all times to keep the tile thoroughly moist during the process of setting, for no matter how much care is given to the other steps in the process of making, if the tile are not properly hardened unsatisfactory results will follow.

Concrete tile that are made in accordance with the best recognized process should become better rather than poorer when placed in the drain and one could reasonably expect such tile to last indefinitely.

A more complete report of this investigation has been published in Special Bulletin No. 75 and those interested may secure a copy by applying to

DIVISION OF CHEMISTRY,
EXPERIMENT STATION.

EAST LANSING, MICHIGAN
April 21st, 1916.