

DRAINING FOR PROFIT
AND
DRAINING FOR HEALTH.

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NEW AND REVISED EDITION.

"EVERY REPORTED CASE OF FAILURE IN DRAINAGE WHICH WE HAVE INVESTIGATED, HAS DEVELOPED ITSELF INTO MISMANAGEMENT, BLUNDERING, BAD MANAGEMENT, OR BAD EXECUTION."—Gibbs.

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Park was first drained, large conduits were in fashion, and they were made circular by placing one horse-shoe tile upon another. It would be difficult to invent a weaker conduit. On re-drainage, innumerable instances were found in which the upper tile was broken through the crown, and had dropped into the lower. Next came the Σ form, tile and sole in one, and much reduced in size—a great advance; and when some skillful operator had laid this tile a round pipe moulded with a flat-bottomed solid sole is now generally substituted, and is an improvement; but is not equal to pipes and collars, nor generally cheaper than they are.

One chief objection to the *Sole-tiles* is, that, in the drying which they undergo, preparatory to the burning, the upper side is contracted, by the more rapid drying, and they often require to be trimmed off with a hatchet before med off with a joint so perfect

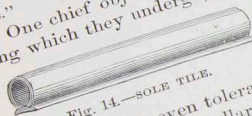


Fig. 14.—SOLE TILE.

they will form even tolerable joints, which can be laid either side up and so secure, that their use, in the smaller drains, should be considered indispensable.

The *double-sole tiles*, which give a much better joint, but they are so heavy as to make the cost of transportation considerably greater.

They are also open to the grave objection that they cannot be fitted with collars. Experience, in both public and private works in this country, and the cumulative testimony of English and French engineers, have demonstrated that the only tile which it is economical to use, is the *best* that can be found, and that the best,—much the best,—and these are unhesitatingly recommended for use in all cases. Round tiles of small sizes should not be laid without collars, as the ability to use these constitutes their chief advantage; holding them perfectly in place, preventing the rattling



Fig. 15.—DOUBLE-SOLE TILE.

HOW TO LAY OUT A SYSTEM OF DRAINS.

in of loose dirt in laying, and giving twice the space for the entrance of water at the joints. A chief advantage of the larger sizes is, that they may be laid on any side and thus made to fit closely. The usual sizes of these tiles are 1½ inches, 2¼ inches, and 3½ inches in interior diameter. Sections of the 2¼ inch make collars for the 1½



Fig. 16.—ROUND TILE AND COLLAR, AND THE SAME AS LAID.

inch, and sections of the 3½ inch make collars for the 2¼ inch. The 3½ inch size does not need collars, as it is easily secured in place, and is only used where the flow of water would be sufficient to wash out the slight quantity of foreign matters that might enter at the joints.

The *size of tile* to be used is a question of consequence. In England, 1-inch pipes are frequently used, but 1½ inch* are recommended for the smallest drains. Beyond this limit, the proper size to select is, the *smallest that can convey the water which will ordinarily reach it after a heavy rain*. The smaller the pipe, the more concentrated the flow, and, consequently, the more thoroughly obstructions will be removed, and the occasional flushing of the pipe, when it is taxed, for a few hours, to its utmost capacity, will insure a thorough cleansing. No inconvenience can result from the fact that, on rare occasions, the drain is unable, for a short time, to discharge all the water that reaches it, and if collars are used, or if the clay be well packed about the pipes, there need be no fear of the drying being displaced by the pressure. An idea of the drying capacity of a 1½-inch tile may be gained from observing its *wetting* capacity, by connecting a pipe of this size with

* Taking the difference of friction into consideration, 1¼ inch pipes have fully twice the discharging capacity of 1-inch pipes.

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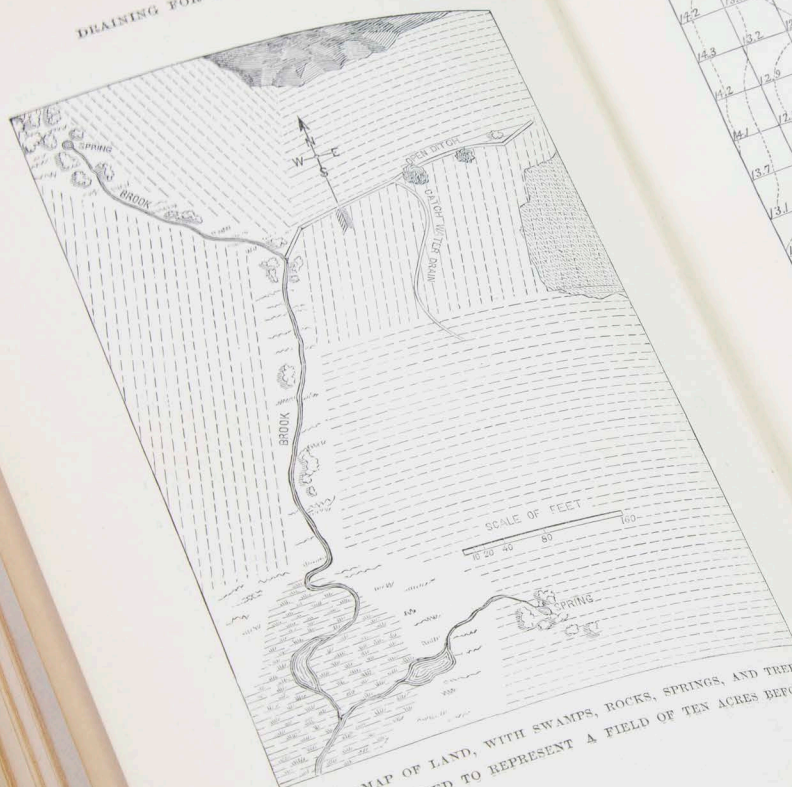


Fig. 4.—MAP OF LAND, WITH SWAMPS, ROCKS, SPRINGS, AND TREES, INTENDED TO REPRESENT A FIELD OF TEN ACRES BEFORE DRAINING.

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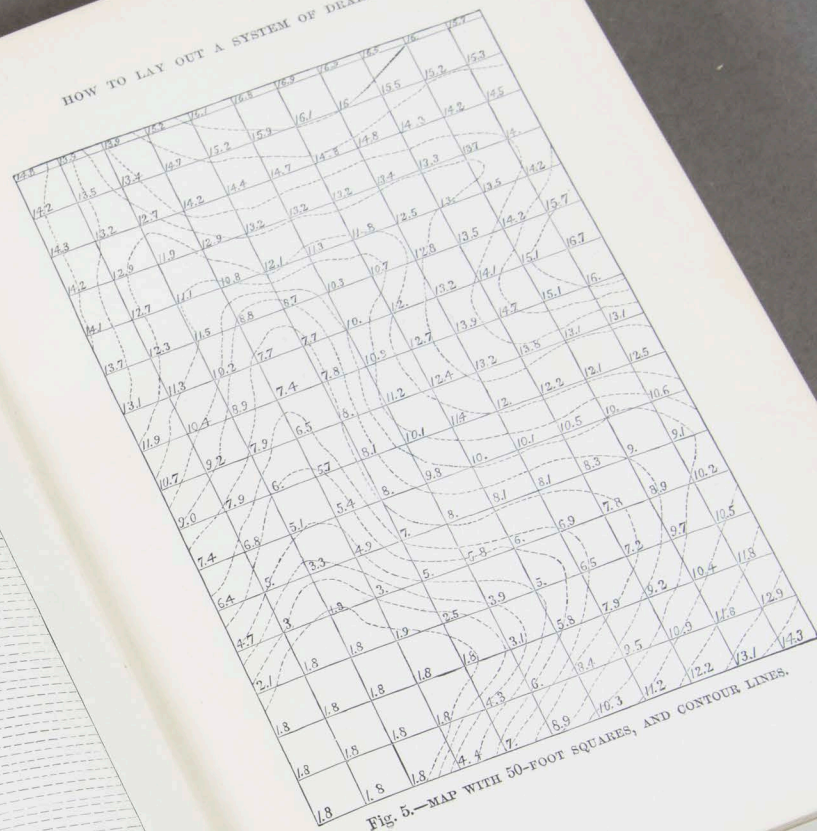


Fig. 5.—MAP WITH 50-FOOT SQUARES, AND CONTOUR LINES.

