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necessary that a system of drainage, for land purposes only, should be carried along the side of a road, the drain should be carried as near the side of the road allowance as possible, and another drain constructed for road purposes as above described. Our road allowances, which are usually 66 feet, are quite wide enough to have this done.

A uniform and sufficient grade in the bottom of the drains is very desirable, and they should at all times be kept in perfect repair. A little attention for a short time will give the sides a sodded bank which will not cave in or wash away. It is also a good thing to sow the sides of the ditch when completed with grass-seed, and thus hasten the sodding of the banks. Culverts should be put in across the roadbed where necessary, and should be made of cast-iron, stone, or vitrified fire-clay pipe. Cast-iron water-pipe, which will not stand the pressure for waterworks purposes, can generally be obtained at the pipe foundries at a reduced cost; they are coated with a solution of hot tar, will not rust, and are almost indestructible, and make an excellent culvert at a reasonable expense. They are also very easily constructed, no skilled labor being required to put a culvert of this description in place. All that is necessary is to dig the trench for the culvert the necessary depth, put the pipe together in the trench, see that the small end of the pipe is placed the full depth into the hub of the next pipe, fill in the remaining space around the hub with some stiff clay or cement, and then fill in the trench and ram down the earth around the pipe. Pipe can be procured up to 6 feet in diameter.

A few cuts of stone culverts are shown in Figs. 4, 5, 6

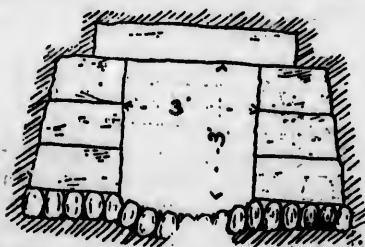


FIG. 4. 3 x 3 feet, Box Culvert.

Hard stone that will not absorb moisture is well adapted for the construction of culverts but a great deal more care must be exercised in constructing them than in putting in iron culverts. The foundations must be perfectly solid and secure, and the whole work done in a first-class manner or else the whole structure will sooner or later prove a failure. If the earth foundation is not of a satisfactory description, then concrete or plank should be used to place