Fine gravel.....	1.00	cubic yards.
Medium sand.....	0.51	"
Silt	0.26	"
Total.....	1.77	cubic yards.

(*b*) When No. 4 mixture was mixed dry and tamped its volume was 1.26 cubic yards.

(*c*) When mixed dry and poured from a height of 0.85 feet into water, and mixed but not tamped, its volume was 1.204 cubic yards.

(*d*) When mixed dry and moistened with 0.30 cubic yards water into a stiff paste and well tamped, its volume was 1.212 cubic yards.

Water, sewer, and gas mains are laid in trenches excavated in materials somewhat similar to those which may be used in earth dams. Of trenches for water mains the writer has superintended the filling in of over 100 miles. Formerly, city engineers required the trenches in all public streets to be filled in in three inch layers and well tamped. In the three systems of water works recently constructed by the writer in this State, permission was granted to fill the trenches under water instead of tamping the earth in thin layers. The method followed was to keep separate while excavating the road metal, gravel, or paving, and the ordinary earth. After the pipe was laid in the trench and caulked, care was taken to tamp sufficient earth beneath, and at the sides of the pipe to give it a continuous and uniform bearing; then earth bridges were thrown in at intervals to prevent floatation and the trench partially filled with water from the hydrants or from irrigating canals. The ordinary earth was then plowed, shovelled, or scraped into the water and the road metal or gravel placed on top.

Trenches filled with dry earth and tamped invariably settled more or less after a heavy rainstorm, but trenches filled under water, although quite soft for a few days, behaved much better and seldom settled.

The foregoing statement does not apply to clay soils since it requires too long for the wet mass to become sufficiently dry to bear up the weight of a horse.

There is every reason to believe, however, that trenches filled with clay placed under water in the manner indicated, would, when freed of the excess moisture, be more stable and less liable to subsequent changes.

In building a distributing reservoir for Ogden City, Utah, the writer adopted a mode of compacting the materials somewhat similar to that outlined in filling in trenches under water. The location was below the old beach line of Lake Bonneville, a name given by geologists to the large fresh water lake of which the present Great Salt Lake forms only a small remnant. The materials were, for the most part, fine sand, with an occasional stratum of coarse gravel, cobblerock, clay or silt. The capacity of the reservoir is 7,000,000 U.S. gals., width of embankment at flowline 30.5 ft., water slopes one and one-half to one, outer slopes two to one, depth of water 20 feet.

After removing the surface soil a trench from 4 ft. to 6 ft. wide and 6 ft. deep was dug along the entire centre line of the proposed embankment. The base of the embankment was then formed and allowed to slope slightly towards its center. Instead of filling in the trench at once, it was allowed to remain nearly full of water, and it became the origin of a canal in the center of the entire embankment. The most impervious material was deposited on the inner half of the embankment, while the cobble rock and more porous material were deposited near the outer edge. The inner, and to some extent, the outer half of the embankment, was built up in layers, moistened and packed in the usual manner. The central portion was built up by emptying the wheelers at each edge of the canal and shovelling the material into the water. Fig. 1 shows a sketch of the partially completed reservoir embankment.