practice in adopting slopes to earth embankments does not often vary from 2 horizontal to 1 vertical. No unprotected earth slope will long withstand the action of waves, even on a 3 to 1 incline, and since some kind of paving is necessary, a 2 to 1 slope of suitable materials and properly constructed is preferable to one flatter. In paving with hydraulic cement concrete, the cost can be considerably lessened by adopting a 1½ to 1 slope on the water side, without lessening to any extent the strength or efficiency of the embankment.

To prevent the destructive effects of waves, ice and frost, to facilitate the removal of silt and aquatic vegetation, to prevent animals from burrowing into the bank, and in many cases to prevent percolation through the bottom and sides, some kind of paving is usually required.

The following brief notes obtained by circular letters describing the mode of paving and the materials used in more than thirty reservoirs in the United States, will give the reader a fairly correct idea of existing conditions:—

Waterworks Reservoir, Charlottesville, Va., 47 Feet Deep.—"Inside slope of dam is paved 12 inches thick with ordinary stone rip-rap."—E. F. Harris, supt.

Lake Montebello Reservoir, Baltimore, Md., 31 Feet Deep.—"Inside slope is rip-rapped with broken stone for a distance of 2 feet above and 3 feet below the flow line."—Wm. Benthall, ass't engineer.

Tatnuck Brook Reservoir, Worcester, Mass., 30 Feet Deep.—"Paved 24 inches thick at top and 18 inches thick at bottom of inside slope with field stone of large size, having interstices filled with smaller stones."—Fred A McClure, supt.

Waterworks Reservoir, Grand Rapids, Mich., 16 Feet Deep.—"Bottom of reservoir is paved 12 inches thick, inside slope from 12 inches at bottom to 2 inches at top with cobble stone laid in cement concrete. Frost has loosened some of the cobble stones at the water line."—H. A. Collar, city engineer.

Indian Creek Reservoir, Boise, Idaho, 50 Feet Deep.—"Inside slope rip-rapped with basalt 18 inches thick."—Chas. L. Swain, engineer.

Storage Reservoir, Amsterdam, N.Y., 65 Feet Deep.—"Face of dam is rip-rapped 1½ feet deep, hand placed. Frost never affects rip-rap. Don't believe in paving."—S. E. Babcock, engineer.

Storage Reservoir, Rochester, N.Y., 15 Feet Deep.—"A berm five feet wide at middle of slope; rip-rap below berm; paved with stone above. Paving laid on gravel lining a few inches thick."—E. Kinchling, chief engineer.

Distributing Reservoir, Rochester, N.Y., 17 Feet Deep.—"On bottom of reservoir 4 inches of gravel spread over surface of clay puddle 12 to 18 inches thick, hauled from brick yard. Rip-rap 24 inches thick below berm. Stone paving 18 inches thick above berm."—E. Kinchling, chief engineer.

Schuyhill River Reservoir, Conchohocken, Pa., 13 Feet Deep.—"12 inches cement concrete on bottom, 4 inches brick on 12 inches cement concrete on slopes. Concrete composed of 1 cement, 3 sand, 5 broken trap rock."—W. E. Ferrier, supt.

Waterworks Reservoir, Sherburne, N.Y., 30 Feet Deep.—"Paved with stone 12 inches thick set at an angle of about 60°. Space filled with gravel."—W. E. Davis, supt.

Storing and Receiving Reservoirs, New Bedford, Mass.—"The inside slope of storing reservoir dam is protected by a paving of large sized boulders. The inside slope of the receiving reservoir has a lining of granite blocks 1 foot thick."—R. C. P. Coggeshall, supt.

Waterworks Reservoir, Waltham, Mass, 15 Feet Deep.—"Bottom and water slopes paved with granite slabs 12 inches thick, laid dry as closely as possible."—L. Brown, supt.

Hartford, Conn.—"We have six reservoirs from 20 to 41 feet deep, paved with stones about what two men can lift, placed close together and filled in with smaller stones."—Henry A. Ayers, supt.

Low Service Reservoir No. 2, Portland, Oregon, 21 Feet Deep.—"Paved with brick, coated with ¼-inch California asphalt laid flatwise in paving pitch."—J. Henry Smith.

Easton Lake Reservoir No. 2, Bridgeport, Conn., 51 Feet Deep.—"Cobble rip-rap 24 inches thick at bottom of slope and 15 inches at top."—S. G. Stoddard, jr., engineer.

Waterworks Reservoir, Covington, Ky., 47 Feet Deep.—"The water slopes are riveted with stone blocks 12 inches thick, laid in cement on a foundation of broken stone 12 inches deep."—W. H. Glore, supt.

Waterworks Reservoir, Erie, Pa., 26 Feet Deep.—"Bottom of reservoir puddled with 18 inches of brick clay put on dry and rolled solid every three or four inch course. Paved with brick laid flat on bottom (2 inches thick), and laid on edge on sides (4 inches thick) with cement, after being laid."—Wm. Hinnel, secretary-treasurer.

Birmingham Reservoir, Birmingham, Ala., 42 Feet Deep.—"Rough sand stone rip-rap 12 inches thick."—W. J. Milner, supt.

Storage Reservoir, Peoria, Ill., 24 Feet Deep.—"Six inches of concrete laid on bottom in about 10 foot squares separated by two rows of brick placed on edge. Water slopes lined with brick eight inches thick. Frost in winter occasionally cracks the bricks at the water surface."—Dabney H. Maury, supt.

Cherry Valley Reservoir, 35 Feet Deep.—"The inside slope of the dam is covered with rubble paving from 12 to 24 inches in thickness, covered with about six inches of selected hard pan to fill the interstices in its surface."—J. C. Hancock, supt.

Cache la Poudre Reservoir, Northern Colorado, 30 Feet Deep. Larimer and Weld Reservoir, Northern Colorado, 22 Feet Deep.—"Inside slope of both reservoirs rip-rapped with mountain sandstone one foot thick laid on two feet of gravel."—Ed. Baker, engineer, Greely, Colo.

Waterworks Reservoir, Ann Arbor, Mich., 14 Feet Deep.—"Slopes protected by rubble or cobble stone."—Chas. E. Green.

Marlette Lake Reservoir, Virginia City, Nevada, — Feet Deep.—"Front of dam paved with rubble. Stone and ice sometimes displace or disarrange the rubble, but not seriously."—J. B. Overton.

Storage Reservoir, Southington, Conn., 25 Feet Deep.—"The water slope of the dam was covered 18 inches in depth with small broken stone, over which was laid a paving of large stone 15 inches in depth."—J. H. McKenzie.

The use of brush or willows tied together and anchored by means of galvanized wire is not uncommon. The small private irrigating reservoirs of Western America are frequently protected from wave action by wheat straw held down by strands of barbed