graded as shown in Fig. 2 so that the full hydraulic work could be started under favorable conditions. These materials varied from coarse gravels for the toes to finer materials near the topsoil core. They were placed in layers and consolidated, generally with 3-wheeled highway or with sheep's foot rollers, although consolidation by dumping into pools of water was permitted in some locations. For rolling the moisture content was specified to be not less than 12 nor more than 20 per cent of the dry weight and the number of trips not less than 4 nor more than 6. The degree of compacting obtained on the work showed a density generally of 110 to 130 pounds per cubic foot, which for this material is a porosity averaging about 30 per cent.

Material for the full hydraulic embankment is excavated in the borrow pits with power shovels, transported to a mixing or "hog" box by large trucks carrying about 10 cubic yards and there is mixed with water and sluiced onto the dam through a dredge pump and 20 inch pipe lines, carrying 10 to 15 per cent solids (average 12 per cent), which deposit the material on the beaches, the coarser particles being deposited according to size in the shoulders, and the finer being carried into the central pool to form the impervious core. About 50,000 cubic yards per week is now being placed in this manner in the Dike. Larger stones and boulders encountered in the borrow pits are transported onto the shoulders of the Dike with trucks to further increase the stability of the structure.

Samples from the core and beaches are taken and tested for grain size, porosity, permeability, shearing resistance, etc., and these results are used to check the visual control of the work. The consolidation of the core is observed by forcing rods into the core, and also by sampling through ports left in a vertical 36 inch steel observation well being built in the core of the Dike.

The qualities of materials in the core and shoulders of the Dike are best illustrated by Fig. 5, 7, 8 and 9. Fig. 9 is a theoretical chart of qualities of samples from the Dike indicating the expected results, and used as guide in checking the work. Fig. 6 shows the grain size characteristics of the borrow pit materials used for the Dike construction and Fig. 7 of samples taken from the various parts of the embankment during construction.

Fig. 6 also shows a comparison of the borrow pit materials used for the Dike and those used for other hydraulic-fill structures elsewhere in the United States and Fig. 8 a comparison of core samples of the Dike with those of other like dams.

The upstream face of the embankment will be protected with riprap and the downstream face will be dressed with loam and grassed as illustrated in Fig. 2. A road with a stonewall on either side will run across the top of each structure.

The work is being carried on by the Metropolitan District Water Supply Commission. The engineering is in charge of Frank E. Winsor, chief engineer, Karl R. Kennison being assistant chief engineer. The author is associate civil engineer in charge of design of the dams and appurtenant hydraulic works and N. LeRoy Hammond is division engineer in charge of construction of the Quabbin Dike.

No. Z-16 SOIL MECHANICS LABORATORY AT THE TECHNICAL UNIVERSITY OF BUDAPEST, HUNGARY

Dr. Ing. Joseph Jaky

1. Royal Hungarian University of Technical Sciences, Budapest, established in 1930.
2. Dr. Ing. Joseph Jaky, Professor of Railroad Engineering, Communication and Soil Mechanics; two regular, and in average five temporary employees, in part students.
3. Principal purpose is consulting service, research is done as funds permit, instruction is carried on for one semester each year.
4. (a) Total floor area: 100 m². (b) Grain size distribution: Tyler system sieves, streamlined hydrometers. Porosity, relative density: 1" brass cylinders. Water content: scales, oven watch glasses. Specific Gravity: boiling in Picnometer. Atterberg limits: BPR. Liquid Limit Device, 3mm threads, linear shrinkage. (c) Aluminum shear boxes, three different sizes. These are nearing completion, and will be in use by the time of the Conference. (d) Vandervoort machine for 1-2" cylinders. (e) Bronze rings of 4.5, 7.5, and 11.0 cm in diameter, mounted on commercial, 500 kg scales. These also are nearing completion, and will be in use by the time of the Conference. (f) Permeability tests: graduated buretts and horizontal capillarity tube; capillary rise: long glass pipes.
6. Various pleistocen, oligocen and alluvial clays: Moderate difference between undisturbed and remolded samples, LL = 45%, PL = 20%.
7. Compressive strength of clay samples as determined by unconfined compression tests, varies considerably with the sample's geometric proportions. Results of consolidation tests seem to be also influenced by size of samples.
8. Several investigations of settlements of buildings, and of earthslides; subgrade-soil investigations on 300 km highways, involving 1,600 samples, of which 800 have been identified, and 800 have been tested. On the 800 tested samples there were performed approximately 500 hydrometer, 500 liquid plastic limit, 300 shrinkage limit, and 300 height of capillary rise tests.