constant over the greatest portion of the structure, as can be seen from the table in Fig. 2.

In order to cut down the first cost of the structure the section was not given the required thickness for the ultimate height of 305 ft., but only the thickness necessary for a 260-ft. dam. So, when the time comes to extend the crest of the dam to Elev. 4,905, a slab of concrete must be added to the downstream face, and, in order to effect a good bond between the present dam and the new slab, the downstream face of the present dam has been stepped off and a sufficient number of iron rods (old rails) have been left protruding several feet to grip the new slab and hold it in place.

The two outlets have their intakes through solid rock at a point about 50 ft. upstream from the upstream face. These intakes are covered with a heavy grating of flat steel bars set on edge, and are the ends of short steel pipes which extend into tunnels to a gate chamber in each. The intake pipe tapers from 10 ft. to 6 ft. at the gate. The gate has a cast steel butterfly valve which is operated through a lever and gear mechanism by either hand-wheel or 7½-h.p. induction motor specially designed for the purpose. Access to this chamber is provided through a tunnel which connects with the inspection tunnel into the dam, this tunnel being driven through the rock, and by means of a vertical shaft is brought above the dam to the gate house. One intake is to Elev. 4,670 and the other is located 100 ft. above. The upper intake slopes downwards about 48° until it meets the lower tunnel, this slope starting a few feet back of the upper butterfly valve. About 1,000 ft. downstream the single pressure tunnel, which is concrete lined, ends in an adit, and is there provided with a second butterfly valve and also with two pressure reducers. Later, it is intended to install a 5,000-kw. turbine and to let this act as a pressure reducer by utilizing whatever head there may be in the reservoir. From this point the water flows by gravity towards the power house below, of which one is built, and four more projected using the same water.

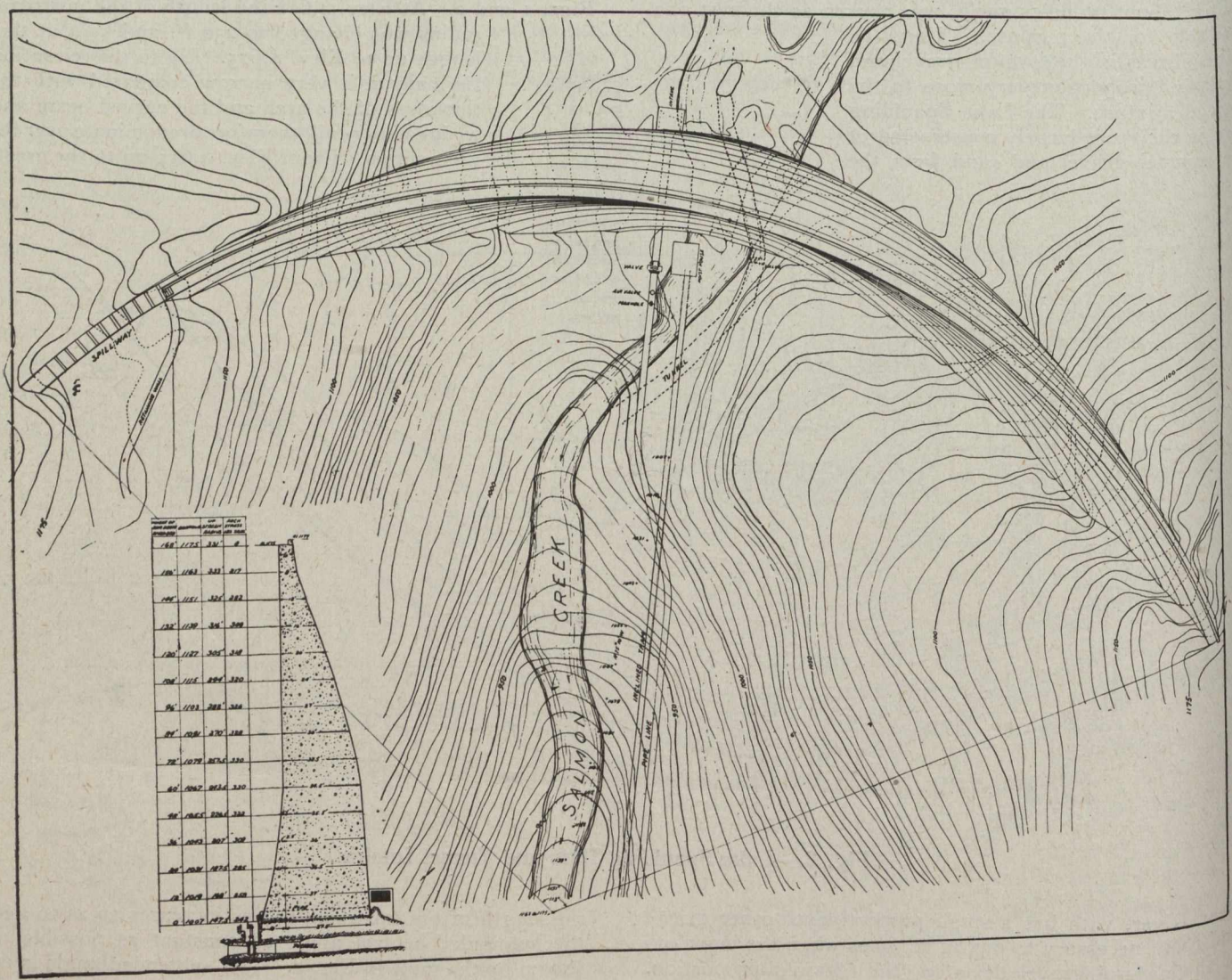

Fig. 3.—Salmon Creek Dam, Near Juneau, Alaska.

In the actual design as used (Fig. 2) the writer's arch theory and the shape of the upstream face suggested in designs submitted by him, have been followed except near the foundation, as already explained.

This dam has developed one vertical crack between each contraction joint, tending to show that, for this case at least, 80 ft. between each of these joints was too great a distance. The cracks and the contraction joints close when the water pressure comes on the structure. The dam, as far as completed, contains 153,000 cu. yds. of concrete. A saving of 46,000 cu. yds. was brought about by the new design. The cost, including everything except