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UGMS
HAZARDS SECTION

August 14, 1985

TO: Peter Lin
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FROM: Ben Everitt

SUBJECT: Laketown Project

This is to report on two recent trips to Laketown, Utah, to inspect the existing reservoir and sites for proposed new reservoirs.

The geology is fairly simple: the valley is underlain by unconsolidated sediment, and the hills are underlain by either limestone or dolomite of Paleozoic age or the lime-cemented Wasatch Formation. Both rock formations are hard, brittle, and composed mostly of calcium carbonate. South and east of Laketown, the limestone is intensely fractured into angular blocks a foot or less on a side. It is likely that the subsurface fractures have been opened by solution, forming a very permeable substrate.

The small existing reservoir in Laketown Canyon (Figure 1) has a capacity of about 10 acre feet. It is underlain by fractured limestone. We understand that seepage losses are estimated to be about 1 cfs when it is full. During our visit on 24 June 1985, the reservoir was drawn down, permitting inspection of part of the bottom and sides, which showed a curious network of cracks and several sinkholes where reservoir silt has been piped into the subsurface (Figure 2). At the head of the reservoir is a delta of gravel, sand, and silt of unknown thickness. The cracks are best developed on the silty surface of this delta below reservoir high water, forming a roughly rectangular network, parallel and perpendicular to the valley (Figure 3). The cracks are not straight, but meander somewhat. They are not associated with ridges, but appear on the otherwise flat alluvial surface. Fresh cracks are open to 1 inch (Figure 4). Sinkholes near the intersection of cracks are as much as 5 feet wide and 3 feet deep (Figure 5). Cracks and holes near the existing water surface are dry; the bottom of the big sinkhole (Figure 5) was dry 2 feet below reservoir level, suggesting that the contents of the reservoir are perched upon the silt blanket overlying a permeable substrate. Water fed into a sinkhole by hand digging a shallow channel from the reservoir required a flow of about 2 gpm to maintain a two-sq. foot puddle in the bottom of the hole for 5 minutes

Proposal

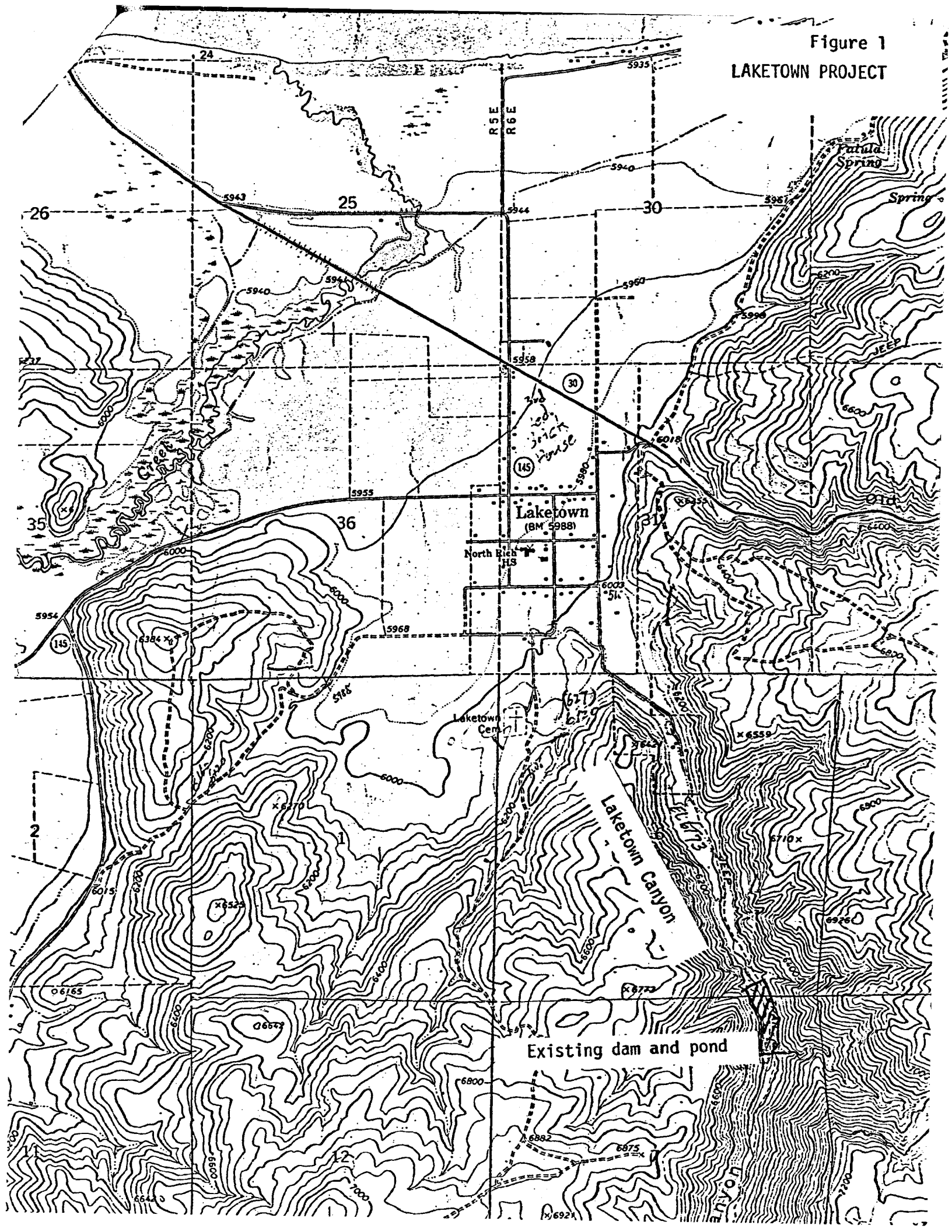
I believe that water can probably be salvaged by improving the reservoir lining. However, the cracking of the natural silt blanket and, the fact that sink holes exist in the reservoir after 100 years of operation raises questions about the feasibility of attempting to plug the leaks.

Following the irrigation season, when the reservoir has been emptied and allowed to dry for a week or so, I would like to excavate some test pits in the reservoir basin to determine the thickness of the natural silt blanket, estimate the permeability of the sediment, and investigate the structure of the cracks and sinkholes. This will permit an estimate of the extent of blanketing required to prevent seepage, and what kind of filter may be necessary beneath the blanket.

No test pits were dug at the proposed sites for new ponds. All are underlain by limestone at shallow depth, and may be subject to the same seepage and piping problems as the existing pond.

Figure 1

LAKETOWN PROJECT



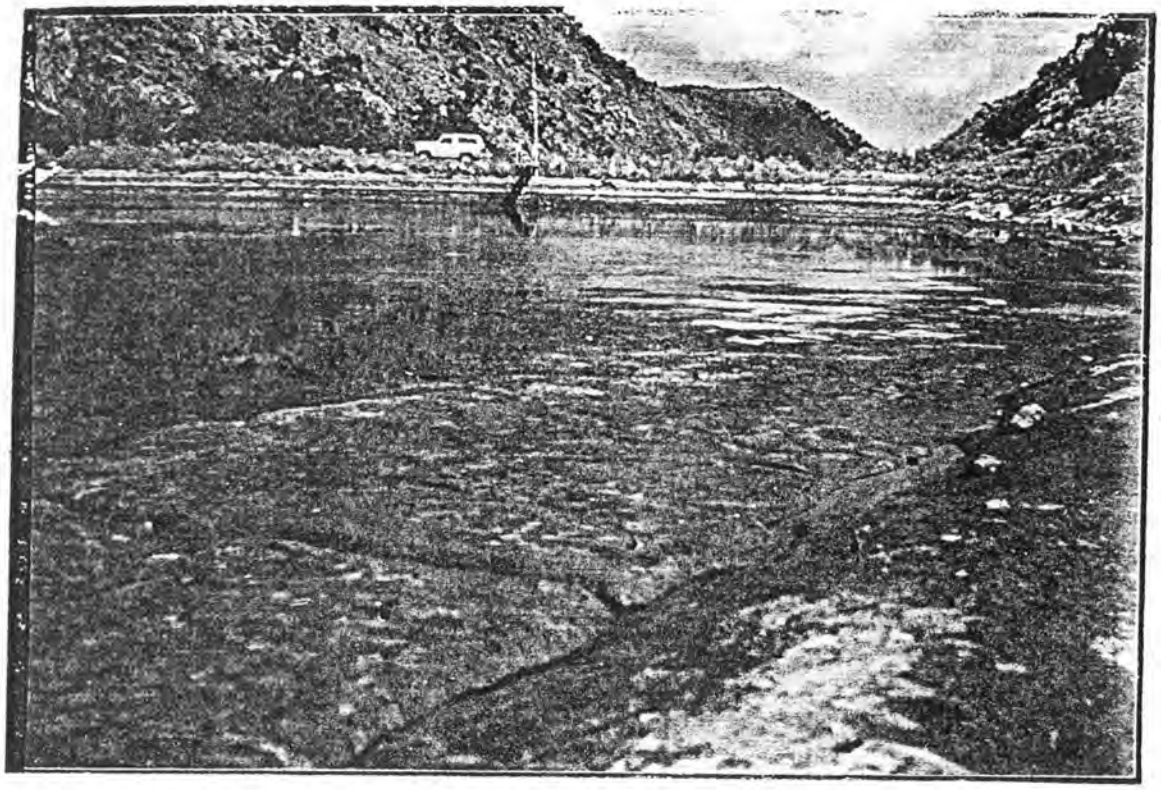


Figure 2. Ground cracks in the reservoir basin, view downstream

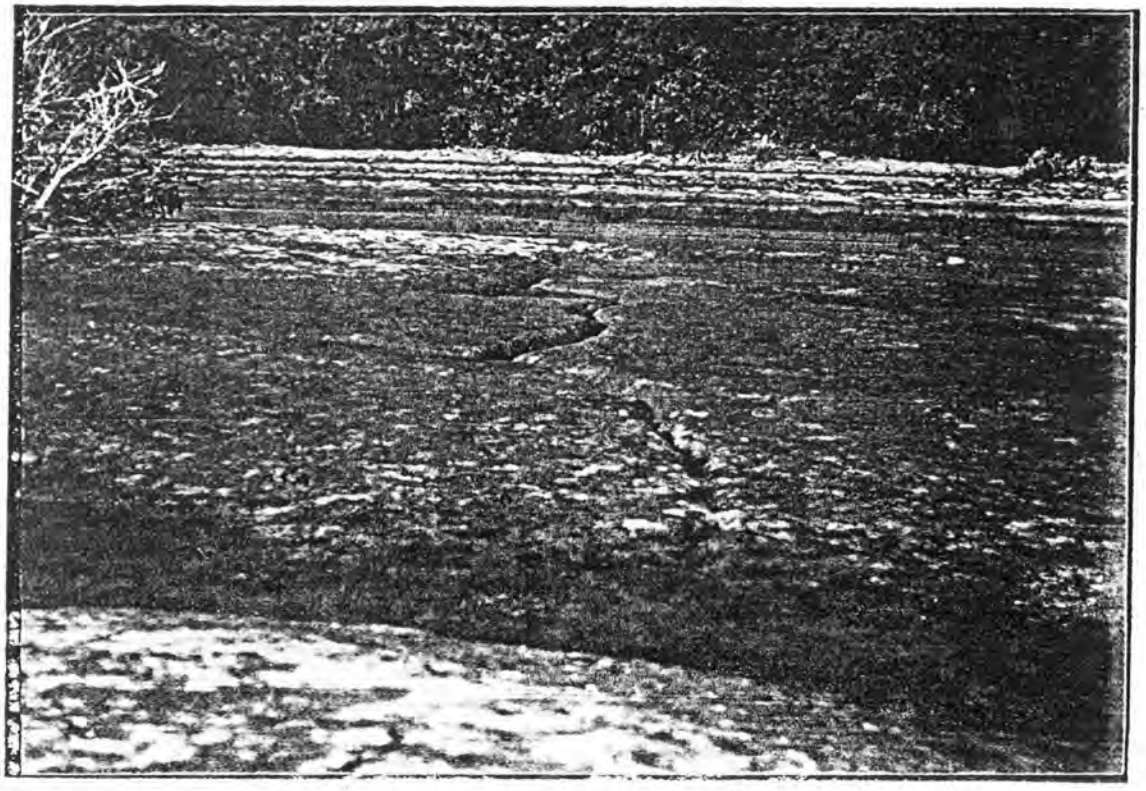


Figure 3. The cross-valley cracks are sinuous, and are not associated with broad ridges or depressions.

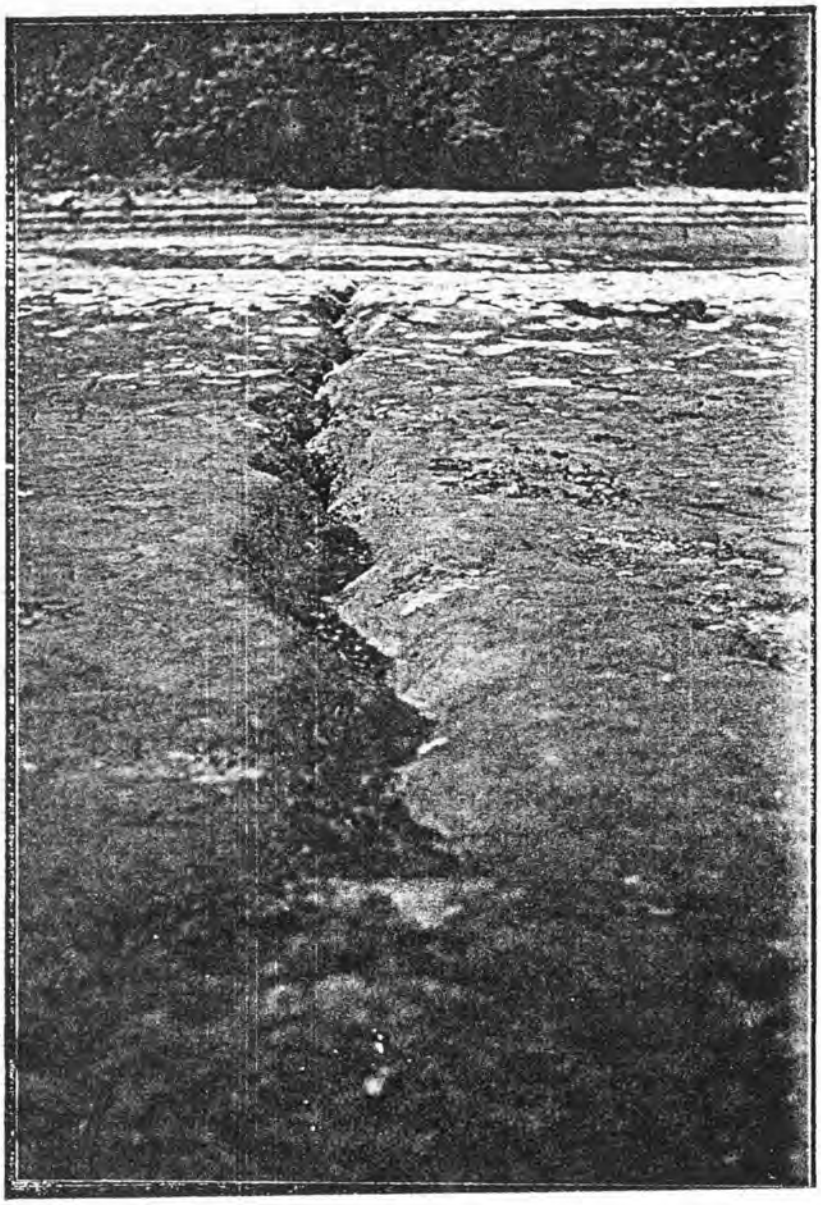


Figure 4. Fresh cracks are open to 1 inch and are taking water

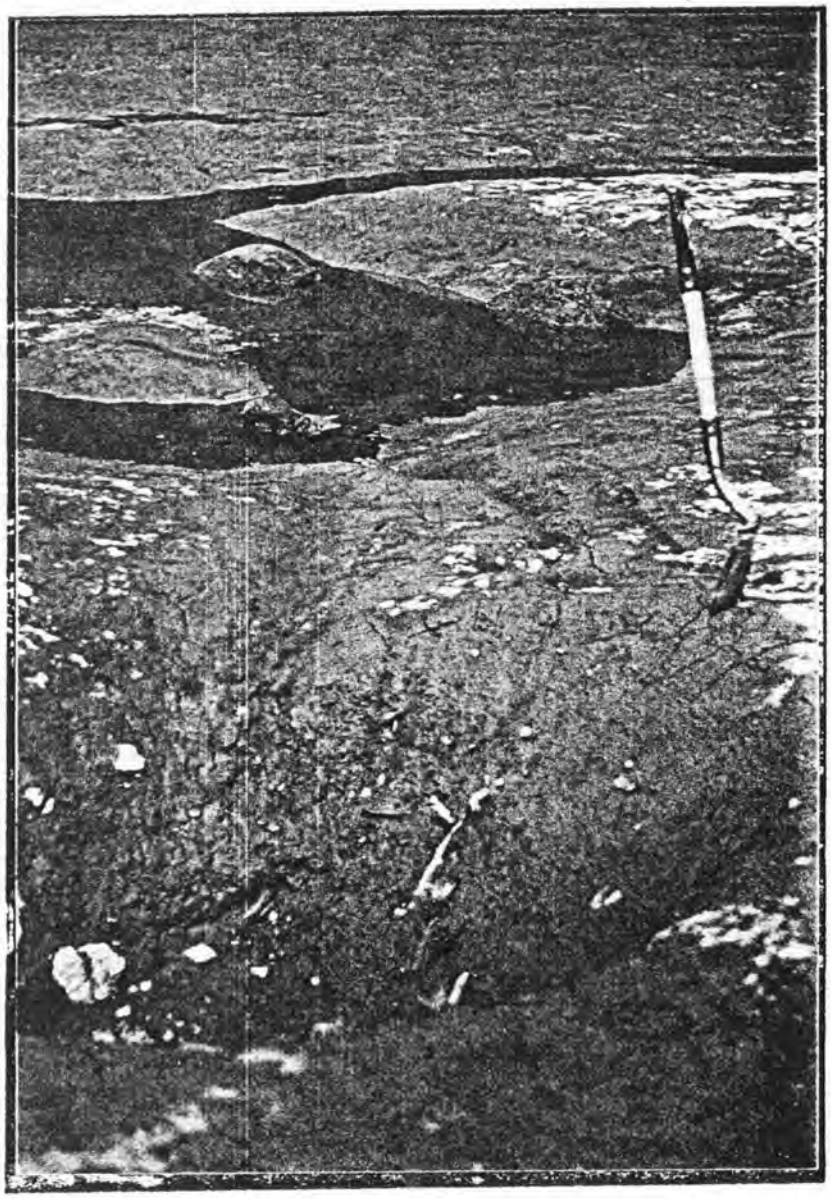


Figure 5. The largest of the sink holes, near the intersection of two ground cracks, is 5 feet wide and 3 feet deep, with the bottom 2 feet below water level in the reservoir.