

of the dam or of a portion of it, by the mere force of the weight of water moving it forward on its bed; as also, at Austin, Cal., in 1906, though not, in that case, due to the same cause of deterioration of binder.

The Camden dam, under consideration, did not, however, fail through this cause, though, as just said, it might have done so hereafter, by percolation, through the stiff clay underlying the brick lining and thence through the sandy and non-retentive material of the embankment proper.

The occurrence, on this occasion, was due to the negligence or omission to close the influent pipes to the reservoir, thus allowing the water to overtop the embankment, and gradually breaching it at the top, as with the Mississippi and its confining levees on either side, the outpour of water, soon to wear it away by erosion and make unto itself a channel as it did in this case, through which the whole reservoir was emptied.

The writer's attention being thus again called to dam failures in general, he would remind all those who are now so often called on, all over the country, to construct dams for water powers for the diverse purposes of pulp mills, water works and electric and other works, of the theory advocated by him in a paper read before the Society, on "Dams and Retaining Walls"; the conclusions of the writer being, that in designing dams in general, the thickness at any point of their height should be equal to the height of water above that point, including depth of overflow.

Had there been no overflow at Austin, the dam would have stood the pressure; but the overflow was twelve feet, which would have required an extension of or addition to the thickness, of as many feet, and have required the dam at top to be at least twelve feet in thickness or equal to the height of water overtopping it.

The overflow alluded to should not have occurred and would not, had enough been known about the possibilities of the watershed, to allow for it in one or more spill-ways capable of dealing with the surplus waters, or by a system of flood gates as provided at Assouan in the new dam across the Nile, and elsewhere.

The writer will now call the attention of the Society to, and endeavor to analyze a most instructive synopsis entitled "A list of failures of American dams," from the Presidential address of W. R. Hill, M. Am. S. C. E., before the American W.W. Assn., as published at pages 290, 293 of the New York "Engineering Record," for September, 1902.