

exposed to the most violent force of the current, but its height has gradually diminished, and it will in time sink out of sight.

The stone protection above the bridge was begun during this flood, and continued through the summer and early autumn of the same year; it was carried westward from the point where the rocky bluff and shore line separate above the bridge, to within 150 yards of the State line. This protection was executed under the direction of the engineers, a portion of the expense being borne by the city. It consists of a simple revetement of riprap stone, a large portion of the stone used having been taken from a cut in the southern approach to the bridge. Whenever practicable, the shore was first worked by laborers to a slope of about one to one, and the stone was evenly distributed over this slope; but when the revetement was begun, the water was too high to admit of this, and the stone was simply dumped over the bank, till the heap appeared above the surface of the water. This protection has required some repairing, the stones having slid down the slope, replacing the soil which the river had washed from beneath them; but it has proved perfectly effective, and the river has in no instance changed the line of the protected shore. In the following spring the protection was extended to the State line, and during the low-water season of 1868-69, it was carried, in the interest of the land owners, as far as the mouth of the Kaw.

The railroad approaches the bridge from the north, with an ascending grade of one in one hundred, till within 618 feet of the bridge, after which the track is level; this leaves room for a train to stand between the grade and the bridge. The 2,380 feet of this approach, adjoining the bridge, is an open trestle work, thus making an effective water-way of 3,775 feet in times of extreme flood, when the bottom land is overflowed. The trestle is substantially built of native oak timber; the 50 bents nearest to the bridge rest on piles, and the others, 90 in number, are on sub-sills. The roadway approach is by a side trestle, built out on the west from the bents of the railroad trestle; it has a grade of four in one hundred. The two approaches unite at the second bent from the bridge, where is placed a toll-house and gates.\* This trestle was built by the

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\* See Plate IX.