

To prevent further encroachments of the river, many years ago, works were undertaken for the protection of the bank in front of the city. These proved successful. They consisted of a number of groins built out from shore, for a short distance, and forming an acute angle with the current.

At each of these groins the current was slightly deflected, and thus gradually forced to follow the bend of the shore.

From what could be seen of these old works, they appeared to be formed of heavy piles driven near the foot of the slope of bank, the space behind being filled with stone and brush; they were, however, so completely embedded in the sand, that it was impossible to see exactly how they were constructed.

This form of protection by groins had been considered with some favour by the chief engineer; but when it was decided to force the current to the east bank it was abandoned and another plan adopted and finally carried out.

This comprised the building of two principal dykes: one to act in turning the channel, causing it to cross from the Kansas shore to the Missouri side; there to follow the east bank, and in a straight course, to pass through the draw-span of the bridge. The second to act as a shore protection on the Kansas side, for a short distance above the bridge.

When these dykes were designed it was assumed that undermining would take place; and they were proportioned in a manner which was considered would give them sufficient tenacity to hold together, while they conformed to any slope which might be caused by undermining, and without much risk of being overturned.

For this reason they were given a wide base, a sloping face and a top load of stone placed so that its centre of gravity was thrown as far back as possible.

The base was made 60 ft.; the face sloping back so as to give a width of from 24 ft. to 30 ft. on top. The back was carried up vertically. The heights varied: in deepest water the height to top of the brush was 25 ft. The depth of channel at low water is taken at 20-ft.

Bed rock was found at a depth of about 45 ft. below low water; upon the bed rock there was a bed of boulders of 5 ft. in thickness; and on top of the boulders, a stratum of clay also of 5 ft. Scour would not take place below the top of the clay. The scour would therefore be restricted to a depth of 15 ft. below the bottom of the channel. When the brush was placed in water less than 20-ft. in depth, and sunk nearly to the bottom, it was considered that scour would take place during the process of sinking; and that the sand would be washed out to, probably, the full depth of the channel.

These assumptions were based upon the results of experiments made on a small scale.

Two sketches shewing cross sections of the dykes are hereto attached:—one shewing the position of the dyke, as built and placed upon the bottom without scour, the other shewing the position which the dyke was assumed to take, under a scour of about 15 ft. and which it did, eventually, in most cases, take.

The work upon the dykes was commenced Sept. 27, 1871, the stage of river being ordinary low water.