

house at foot of Pine street, and 149 feet out from the river bank, bare rock was struck at 15.8 feet from the surface, the river being then $3\frac{1}{2}$ feet above low-water gauge. This rock was drilled into 18 inches without going through, and was found to be a solid limestone ledge.

No. 2. At same place, 294 feet from bank, the same bed-rock was found with 16.5 feet of water.

No. 3. Same place, 396 feet from river bank, sand bottom was found at 21 feet depth of water. A two-inch gas-pipe was then sunk in the sand 46.7 feet without finding rock.

No. 4. Same place, 492 feet from bank, water 12.5 feet deep; gas-pipe driven 52 feet into the sand of river bottom without finding rock.

Nos. 11, 12, 13, 14 and 15 represented a line of soundings from shore to shore at a point 200 feet up-stream from Major Claget's coal mine. No. 15 was 200 feet out from the south shore, and at 21 feet depth of water the bedded limestone, same as Nos. 1 and 2, was found. But at all the other numbers on this line, at an average depth of 51 feet from the surface, there was found a reef of boulders and coarse gravel, with sand again below them.

No. 9. This sounding was 500 feet up-stream from the line last mentioned, and on the north side of the river, 50 feet back on the beach from the water's edge. The result was, they bored through 55 feet of sand and sandy loam, then 8 feet of gravel and shale, then 4 feet of slate and coal, then 13 feet of sand, without finding bed rock. The total depth bored at this point was 80.2 feet.

No. 10. This test-point was 150 feet out in the river from the north shore line, and the water was 4.5 feet deep. At 21 feet below the water surface coal and sand was found; at 22 feet, gravel; at 27 to 46 feet, quick-sand; at 52 feet, gravel; at 94 feet, no bed-rock. Here the tube stuck fast, could not be got out, and is there yet.

Whether the railroad company considered these results such as to warrant them in ever building a railroad bridge at Lexington, no man knoweth; but at this writing (Oct. 1, 1881) there are many signs which seem to indicate that a bridge will sometime be built here, and that the Chicago, Burlington and Quincy railroad company will run its southwestern branch from Burlington, Iowa, by way of the old Lexington and Gulf grade toward Texas.

In October, 1880, Mr. Dunn assisted in making water soundings for the government, from Wellington down to Lexington island, and the deepest water found was opposite the foot of Pine street, where it showed thirty-five feet depth of water *below low-water gauge*.

A little above the old hemp warehouse on Pine street, in the angle of the bluff on the west side of the street, there is a heavy bed of rock facing

the river, and in this rock is a plug of lead with a copper bolt in its center. This is called a government bench mark; the government surveyors have established a similar mark every ten miles along the banks of the Missouri river, from Sioux City to its mouth. These form permanent fixed points from which to reckon all future topographical surveys, but do not seem to have any uniform reference to water level.

WATER LEVELS AND FLOODS.

A mark known as the St. Louis directrix, is the standard gauge from which all levels on the Missouri and Upper Mississippi rivers are reckoned, and that mark is 372 feet above sea level. The government low water gauge-mark at Lexington is at an *assumed elevation* of 424.2 feet above the sea, but that is not certain; and a series of soundings made for the government by Mr. Dunn, of Lexington, on September 20, 1881, gave a depth of 19 feet 4 inches of water, below low water gauge, in the channel a little above Pine street; but there was known to be deeper water below this point.

In 1844 occurred the greatest flood on record in the Missouri river. Another "high water" came in 1877, and another in 1881. The following is their record: 1844, 26.66 feet above Lexington low water gauge; 1877, 17.75 feet above; 1881, 23.10 feet above.

An old city survey reports the top of the curb stone in front of Aull's building, corner of North and Broadway streets, to be 190 feet above low water mark, and that is nearly the level of North or Main street of Lexington City.

RIVER IMPROVEMENT AT LEXINGTON.

From the annual report of U. S. chief engineers, 1880, Part II, page 1409, we quote: "The rapid erosion of the left bank, in the bend just above Lexington, is allowing the whole river to move bodily down stream, and if not checked will soon destroy entirely the harbor and boat-landing at Lexington. The plan proposed contemplates the protection of caving banks by brush-mattress revetments, and the construction of floating dikes, designed and located so as to rectify the channel."

In Part I, page 163, of same report, we find this: "With the funds appropriated by act of June 14, 1880, for improving the Missouri river at this locality (Lexington), it is proposed to commence the work by protecting the banks where necessary with brush revetment, and rectifying the channel by floating brush dikes or other structure (wire mattress is being used, 1881,) designed to produce like effect, as far as the funds available will allow."