

## APPENDIX.

The following letter from O. B. Gunn, Esq., who, as Chief Engineer, made the first survey for the railroad in the Kansas Valley, is valuable in showing the relative heights of various places in the northeastern part of the State:

ATCHISON, KANSAS, Feb. 11, 1865.

*Prof. B. F. Mudge—Dear Sir:* Your favor came duly to hand. \* \* \*  
The rise from Wyandotte to Fort Riley is as follows, starting from low water in the Missouri river at Wyandotte:

Wyandotte to Lawrence, 39 miles, rise 62.022 feet; average, 1.66 feet.  
Lawrence to Topeka, 26 miles, rise 60.04 feet; average, 2.08 feet.  
Topeka to Manhattan, 50 miles, rise 120.06 feet; average 2.04 feet.  
Manhattan to Fort Riley, 17 miles, rise 54.08 feet; average 3.02 feet.  
Total distance, 132 miles; total rise, 297.052 feet; average per mile 2.250 feet.

The foregoing elevations are the surface of the water in each case. The distances are by railroad surveys, and are, probably, not more than two-thirds of the distance which the water actually travels.

Starting from low water in the Missouri river at Atchison, the elevations are as follows:

Water in Grasshopper at Muscotah, 164 feet above the Missouri river.  
Water in Big Blue at Irving, 317 feet above the Missouri river.

It is about 60 miles from Atchison to Wyandotte, by water. Assuming that the Missouri river falls one foot per mile, which is not far from the mark, it brings the elevation of Atchison, when reduced to the base of the Wyandotte levels, to an elevation of 60 feet; Grasshopper at Muscotah, (same base,) 224 feet; Big Blue at Irving, (same base,) 377 feet; elevation of Big Blue at Manhattan, (same base), 242.022; rise from Manhattan to Irving, 134.078. \* \* \* \* \*

Yours truly, O. B. GUNN.

The following elevations are from explorations and surveys for a railroad route from the Mississippi river to the Pacific Ocean—Vol. XI. They are barometrical measurements,

taken at camps, and therefore are not so accurate as those given by Mr. Gunn, but are sufficiently so as to show the total rise in crossing the State westerly, and to show the gradual increase of height. The elevation of the camp above the surface of water is not given. The mouth of the Kansas is about 850 feet above the ocean.

Near Shawnee Mission, Johnson Co., long. 94° 30'	above sea,	991 feet.
Cedar Creek, near Olathe,	" "	1,047 feet.
Tecumseh,	" "	1,234 feet.
Ten miles west of Fort Riley,	" "	1,459 feet.
Mouth of Saline river, long. 97° 40'	" "	1,592 feet.
Mouth of Walnut creek, on Arkansas river,	" "	1,872 feet.
Near Arkansas river, long. 99° 35'	" "	2,004 feet.
Fort Atkinson,* long. 100°	" "	2,330 feet.
Santa Fe crossing of Arkansas, long. 100° 40'	" "	2,431 feet.
Near Arkansas river, long. 101° 20'	" "	2,602 feet.
Near Arkansas river, west line of State, long. 102°	" "	3,047 feet.

The result of all the elevations shows a rise for the first hundred miles of a little over two feet to the mile. For the second and third hundred miles, about six feet to the mile, and for the last hundred miles, about seven feet, or a total rise of 2,200 feet in 400 miles. This shows a very easy grade for a railroad route. Elevation of Fort Scott,† 1,000 feet; elevation of Fort Leavenworth, 896 feet.

\*From records of the Fort.

†From the Fort records.

**ERRATA.**

Page 5, line 17, for "northeastern," read "northwestern."  
 Page 30, lines 30 and 35, for "proxide," read "peroxid."