

shall have (in the width of the State) the territory of the coal lands, 308 miles in length by 107 in average breadth, which gives an area of 22,256 square miles. . . . .

“The Coal Measures here have undergone little change, and lie nearly in their natural position. They dip on the average, as before stated, slightly to the northwest. In some parts of the State this inclination cannot be seen, and in some instances there is an anticlinal ridge or dip in the opposite direction. . . . .

“It will be seen that this small disturbance of the strata is very favorable to the opening of coal shafts. No ‘faults’ will be found in the beds, and the probability of reaching the coal at reliable depths at any given point will be nearly certain. It also gives us a larger area of the coal field, as a higher inclination would soon carry the heads too deep for mining.

“This portion of the State also shows a great uniformity of the strata. About one-fourth of the whole deposit is limestone. South of the Kansas river the strata show an increase of thickness, particularly in the shales, accompanied with a slight increase of dip. This increase of thickness is very marked in Miami county, as developed by the oil and salt borings.

“It is well understood that the extreme upper portion of the coal measures does not contain coal of the first quality, or seams of much thickness. Those peculiarly favorable conditions of climate, &c., which were so important for the accumulation of vast amounts of vegetable matter, had begun to change, so that the coal was small in quantity and poor in quality. A fine illustration of this passing away of the peculiarities of the vegetation of the coal period is to be seen in the banks of the Neosho, about three miles from Council Grove. It consists of a stratum of shale, two feet in thickness, full of the remains of the vegetation of the period, but accompanied by a singular commingling of the materials with the mineral substances, and the vegetation shows less of the transformation from its original state than that of the true coal beds.”

Professor Mudge then gives in detail a report of the borings for coal at Leavenworth, which proved successful. The parties are now engaged in sinking a shaft preparatory to practical and extensive mining. From it I gather that 142 feet of the strata passed through were above the level of the Missouri river, and 230 feet below, when a vein of bituminous shale and coal  $9\frac{1}{2}$  feet thick was reached. At 116 feet below the level of the river, a vein of slate and coal was perforated; but as the second vein is known to be greatly superior, little attention was paid to it. This second vein is known to be the same that is largely worked on the line of the Hannibal and St. Joseph Railroad, some fifty or sixty miles east of Saint Joseph, in Northern Missouri, and which I examined with some attention when I was there last fall. The vein there is about six feet thick, and is, I think, between one and two hundred feet below the surface. The coal