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THE YORK CANYON COAL BED

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The York Canyon coal bed was probably first discovered in the mid-1800's by early explorers on lands of the Maxwell Land Grant. Lee (1917) stated that coal in the Raton coal field was first reported by the Long Expedition in 1820. An early report by St. Auburn (1888, p. 34), evaluating resources of the Maxwell Land Grant, described the York Canyon deposit specifically and mentioned that it had already been leased:

> "... *York Canyon.* The latter is leased to the Raton C. & C. [Coal and Coke] Co. who have made several openings, one drift over 90 feet in length showed over 8 feet of coal, the best showing on the Grant. I visited probably six or seven other openings on the two forks of the Canyon and at each saw the same fine body of coal. My visit was very hurried owing to some disturbance going on among the squatters from which my guide apprehended dire results—forebodings which I am glad to say were not realized; nevertheless it made my trip to these two important outcrops too brief for me to determine much that I should wish to know."

St. Auburn's report and a second report to the Maxwell Land Grant Company in 1 1888 (P. H. van Diest, 1888) indicate that the coal potential of the area was already well known at that time. That portion of the Land Grant containing the coal bed as it was then defined was approximately 6 mi2 (16 km2). The general boundaries of the coal were quite well delineated, although the coal bed is now known to extend somewhat beyond them.

Two early geologists, Orestes H. St. John (1841-1921) and Willis T. Lee (1864-1926), worked extensively in the Raton coal field. St. John first visited the area in 1874 on a private survey, and he returned the following two years as a member of the Hayden Survey. For the five years that he was employed by the Maxwell Land Grant Company (1891-96), he studied the Raton field with a view of ascertaining the magnitude and possibilities of the coal reserves" (Keyes, 1921, p. 39). When the Saint Louis, Rocky Mountain and Pacific Railroad acquired coal rights in the Raton field, St. John became the company geologist. In a letter directed to the Vice President of the Raton Coal and Coke Co., written May 19, 1904, St. John reported his "Recent Geological Observations in the Yorke Canon Coal District, New Mexico."

Although W. T. Lee (Fig. 1) did extensive work in the coal field in 1908 and 1910, and had full access to the notes and records of St. John, he did not include descriptions of the York Canyon coal bed in any of his published works. His main efforts were presumably directed toward proving the existence of the Cretaceous-Tertiary unconformity and the York Canyon area provided no data that would serve this purpose.

The York Canyon coal bed occurs in the *coal-bearing zone* of the Raton Formation of Late Cretaceous and Paleocene age. Its geologic setting is described by Pillmore ("Commercial Coal Beds ...," this Guidebook), and Figures 2 and 3 give an idea of the extent and character of the bed. In the southeast corner of the bed area, the York Canyon coal bed is a 7 ft (2.1 m) thick zone that contains four coal beds less than 2 ft (0.6 m) thick separated by shale partings as thick as 2.5 ft (0.76 m); at the mine it is a 12 ft (3.7 m) zone that contains more than 10 ft (3 m) of coal, 9 ft (2.7 m) of which occurs as a single discrete bed. The bed is consistently at least 6 ft (1.8 m) thick throughout most of the bed area; it presumably extends to the northeast, at a somewhat lesser thickness.

The main coal bed, nearly 9 ft (2.7 m) thick at section 5 (the prospect), thins and splits to the south (Fig. 4). To the east of section F the parting thickened and the upper split thinned until it was no longer mined. Commonly, the point at which the upper bed ceases to be mined is where roof problems commence. In some parts of the mine, "pots,"—peculiarly shaped, slickensided cones of carbonaceous shale and coal (Fig. 5)—present hazards to miners. They are a compaction phenomenon, possibly localized by swamp gas bubbles. These bodies occur in the shale directly over the coal bed; when mining passes under an area where these objects occur, the cone-shaped masses may not be dislodged immediately, but sometimes later fall from the roof. When pots are known to be present, an attempt is generally made to pry them out as a safety measure. When a pot falls, it leaves a distinctive shiny slickensided cast in the mine roof.

The main bed also thins to the north from section 5, and additional splits of coal begin to appear. At section A, a massive sandstone fills a channel cut through overlying rocks into the coal bed itself. The channel may possibly cut the coal out completely, forming a "want" in the coal, but this situation has not been observed underground.

The York Canyon bed thins to the east and develops a parting in that direction as well (Fig. 6). To the west from section 5, the main coal thins rapidly and the parting at the top of the bed thickens to a sequence of mudstone, siltstone and sandstone greater than 30 ft (9 m) thick. Along the western part of the bed area, both the upper and lower benches are presumed to be minable.

Presently, in the York Canyon mine, the coal bed has been mined throughout an area of nearly 2 mi2 (5.2 km2) and

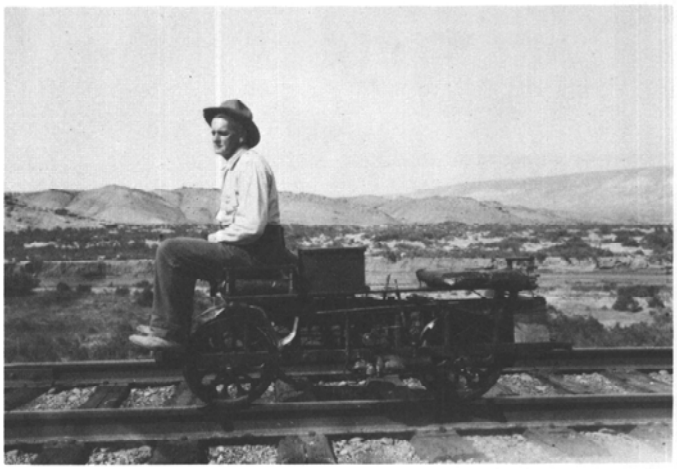

Figure 1. W. T. Lee on gasoline speeder, doing field work, 1914.

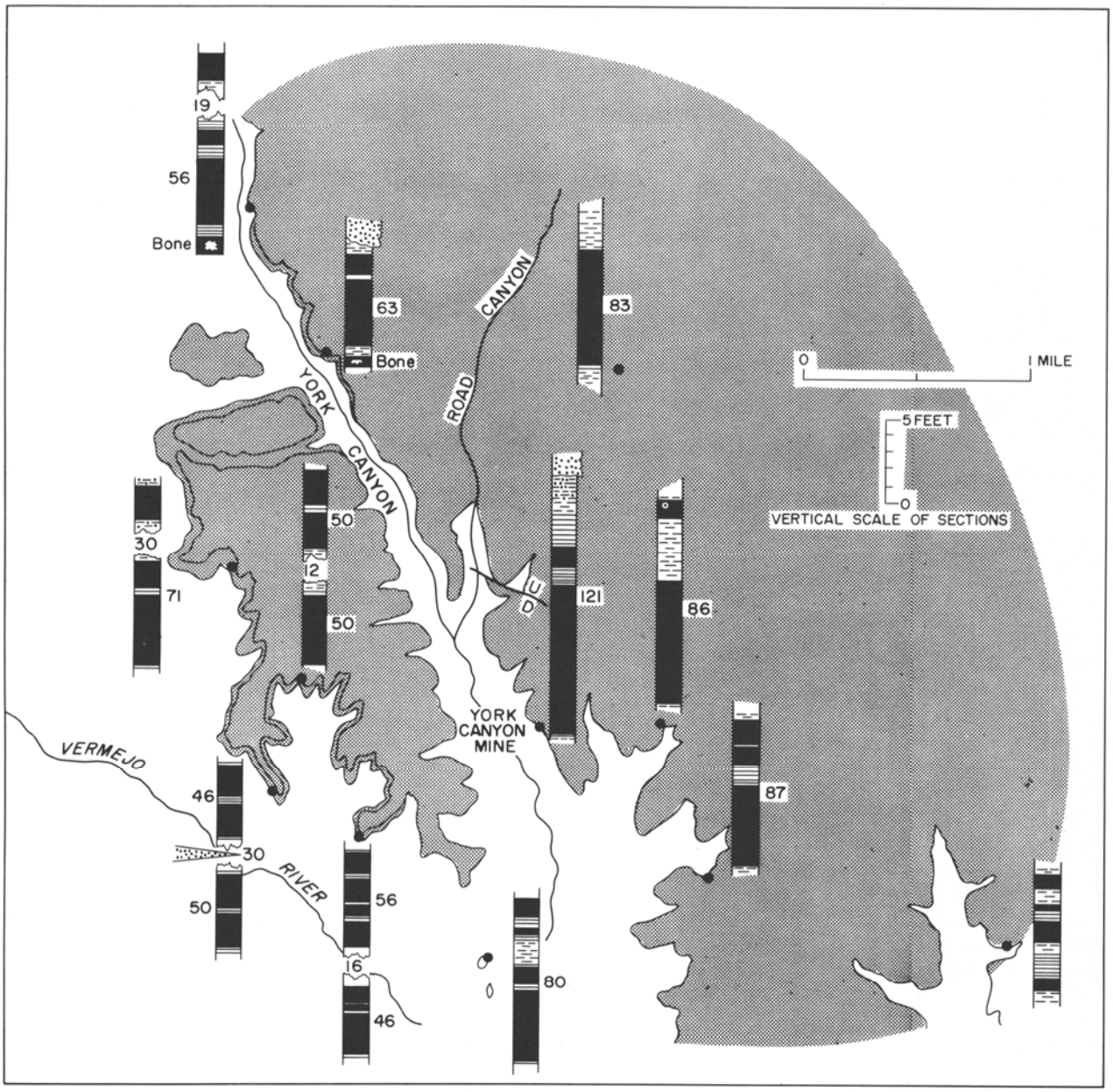

Figure 2. Bed-area map of York Canyon coal bed showing area underlain by coal, the outcrop and coal sections. Numbers at side of sections denote coal thickness in inches; numbers at break in sections denote parting thicknesses in feet.

several hundred acres have been surface mined (Fig. 7). Many small faults were encountered underground that appear to have been caused by unequal compaction of underlying sediments. Thicknesses of sediment composed of vegetal trash, clay and mud are more compactible than comparable thicknesses of sand or silt, and displacement occurs around the margins of the sand and silt bodies.

A fault of relatively large displacement occurs at the center of the mine (Fig. 7). This is the only fault observed at the surface, and it caused considerable problems during underground mining. A picture of this fault at the prospect, located at section 5, is shown in the Second Day Road Log at mile 36. This fault was earlier observed by Orestes St. John and described in his 1904 report on York Canyon:

> "Disturbances resulting in the faulting of the strata more or less transverse to the general course (northerly) of the Vermejo Park fold to the west have already been alluded to. In the vicinity of the confluence of Road and Yorke canons, in an east side ravine appearances indicate a still more marked break in the strata and probably attributable to faulting with southerly throw of 50 feet. Time did not permit more than casual observations, and the actual nature and extent of the disturbance are matters still of conjecture. Their presence, however, has serious economic significance, complicating the problem of mine development of the district."

The York Canyon mine was opened in 1966 by Kaiser Steel Corp. and has produced coal from the York Canyon coal bed at an average rate of 785,000 tons per year since that time. Production for 1975, both from the underground and surface

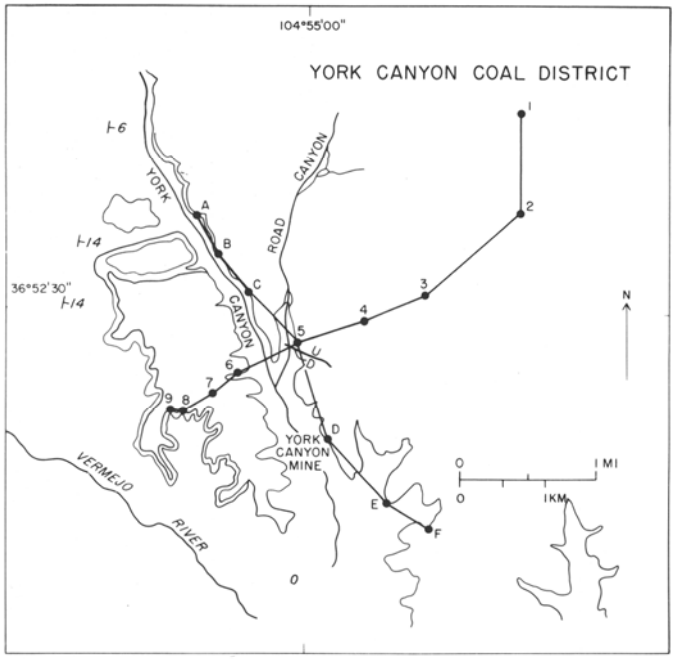

Figure 3. Map of York Canyon coal district showing outcrop of coal bed and lines of section.

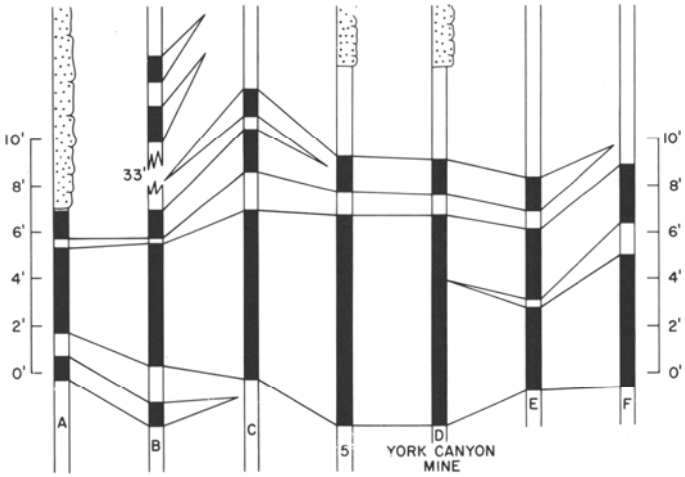

Figure 4. North-south line of coal sections, York Canyon coal bed.

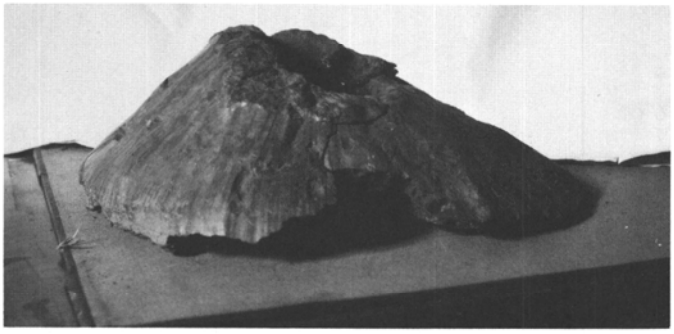

Figure 5. Cast of "pot" taken in roof at Sugarite mine east of Raton, N. Mex. Dark area at apex is vitric coal. Feature shown is similar to those in roof occurring in parts of York Canyon mine. Photograph by W. T. Lee, n.d.

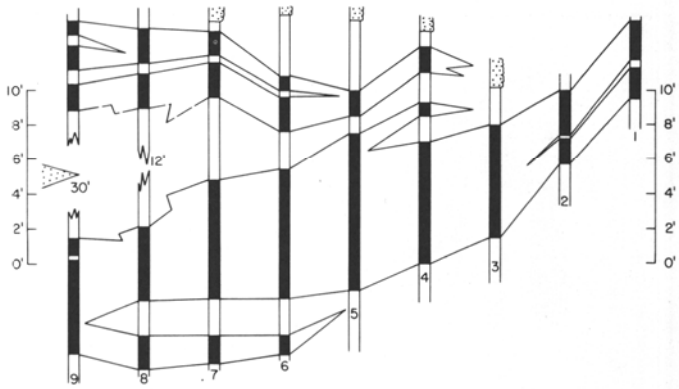

Figure 6. East-west line of coal sections, York Canyon coal bed.

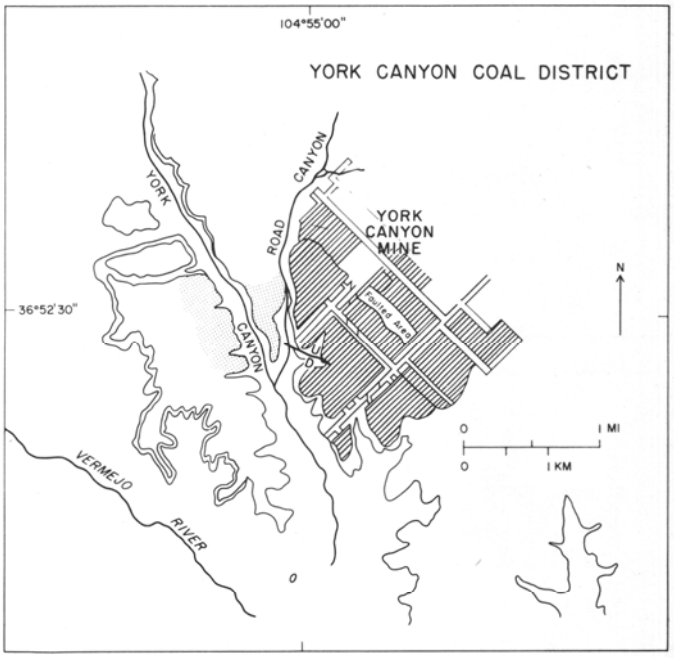

Figure 7. Generalized mine map; lined pattern shows underground area mined to June, 1976. Dark line at center denotes fault in the coal bed; U, upthrown side; D, downthrown side. Stipple pattern shows area surface mined.

mines, was 1,016,000 tons. Production will increase when a new dragline goes into operation. Coal from the York Canyon mine is of highest quality; blended with coals from other areas it forms an excellent coke and is a strong competitor on the world market.

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