

*The Dogden Butte Lignite Area.*—This series of outcrops lies in the edge of the hills thirty-two miles west-northwest of the Pony Gulch mine. The outcrops of the Dogden Butte mines have been exposed by the post-glacial erosion of small coulee making streams flowing from the hills above the butte, while the lignite bench of Pony gulch was left by the ice practically without drift covering. Both series of outcrops face sloughs on the northeast, and in both the lignite seam extends back under the hills. They belong to the same horizon and have an elevation of about 1,600 feet. If these seams are assumed to be continuous, lying practically horizontal as they do, the trend of the seam to the west would bring it to a point 140 feet below the Missouri river at Coal Harbor. Again, following the seam to the northwest, it would fall in the horizon of the Hanchett, Turtle Gulch and Burlington mines. These outcrops furnish an illustration of the thickening of the lignite. The Pony Gulch seam averages three and a half feet ; the outcrop one mile to the northwest reaches a maximum of eighteen inches. The Rose Hill vein has a thickness of eight feet, and the openings five miles to the northwest reach a thickness of but four feet. In the same horizon fourteen miles northwest of the Dogden Butte the seam reaches the great thickness of sixteen feet. Between these points the seam

probably thins out to but a trace in some places. On the other hand, there are undoubtedly many places where the drifts and slips of native clay conceal a thickness of lignite which would well repay prospecting in a more thorough manner.

Dogden Butte, which furnishes a name for this small mining center, is a large hill of Laramie clay, surmounted by a great mass of glacial material. The entire butte stands out strongly in relief from the other hills in the background, rising some 300 feet above the flat, benchlike area bordering its base. Streams have deeply grooved its sides, forming coulees that direct the waters of the melting snows of spring in a dozen different directions towards the sloughs on the north and east. These coulees support a dense growth of cottonwoods, wild cherry, plum trees, and a large number of burr oaks, the oaks having a diameter often of fifteen inches. The unusual growth of timber in the larger coulees can be accounted for by the fact that they lie open to the northeast, a condition that protects the vegetation from the direct rays of the sun in summer and from the northwest wind of winter.

The streams that have formed the deep V-shaped channels at the base of the butte, not only carried away the drift covering, but also cut down into the Laramie clays in such a manner as to expose the lignite in many places. It is these wide open outcrops, and the ease with which the coal can be removed that have invited miners to this area, though it is sixteen miles from the nearest town. The mines extend over a distance of five miles, beginning with the Rose Hill mine at the south and ending with the Jones or Bentley mine at the north side of the butte.