

**RECONSTRUCTION OF THE UNION PACIFIC RAILROAD.**

The Union Pacific Railroad was the first trans-continental line to connect the Eastern States with the Pacific coast, and, as in the case of many of its successors, its line was located with a strict view to economy of first cost, and with little, if any, regard to economy of operation; consequently there are in this and in other pioneer roads so much sharp curvature and such steep grades that a severe limit is put upon the number of cars that can be hauled by a single locomotive. Of late years, as the traffic over these early roads has increased, the work of relocating the line, with a view to straightening out the curvature and easing the grades, has been pushed with more or less activity. Probably the greatest work of this kind is that which is now being completed on a stretch of the Union Pacific Railroad between Cheyenne and Evans-ton in Wyoming. The execution of this costly reconstruction is due to the energy of H. G. Burt, the president of the road, and it is being carried on under the direction of J. B. Perry, the chief engineer.

The greatest hindrance to transportation on the old line was the steep grade over Sherman Hill, which had a maximum ascent of 97.7 feet to the mile. To get around this obstacle, the line between Beaufort and Loraine, a distance of 30 miles, was relocated, and the new survey showed that the summit could be crossed at an elevation 250 feet lower than the old line, and that the desired maximum grade of 43.3 feet per mile could be obtained by cutting a tunnel about 1,800 feet in length. Including this reconstruction, there are about eight different

fuel used, and a considerable increase in the loads that can be hauled. Thus, the old grade of Sherman Hill necessitated the assistance of fifteen extra locomotives to carry trains over the grade, whereas since the change no extras whatever are required. The total cost of the work has been put down at \$15,000,000, and it is estimated that the reduction in actual operating expenses and the increase in earnings will enable the road to recover the outlay within a reasonable time.

The first improvement lies west of Cheyenne, in the Beaufort-Laramie cutoff. The distance by the new

our illustrations in process of removal. A point of interest to those who have traveled over the Union Pacific line is that the new line will carry passengers across the summit, at a considerable distance from the great pyramid of cut stone, costing \$80,000, which was erected at the old summit to the memory of Oakes Ames and his brother, through whose labors the Union Pacific Road was completed in a remarkably short time.

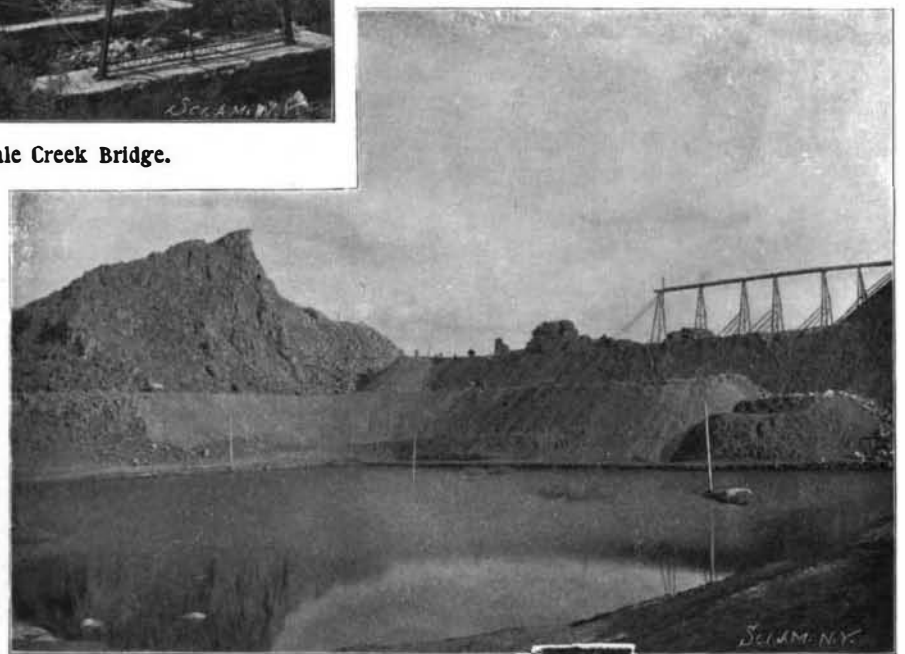
The next cutoff, from Howell to Huttons, results in a saving of 3.11 miles of distance, with only a single one-degree curve in the whole 15 miles. The location from Cooper's Lake to Lookout saves 0.38 mile in distance; the grade is reduced from 52.8 feet per mile to 43.3 feet, and the maximum curvature from 5 deg. to 1½ deg. At the next cutoff 12.03 miles of distance is saved, and the grade is reduced from 53.9 to 43.3. On the next, from Allen Junction to Dana, 3.87 miles is saved, and the maximum grade is reduced from 75.3 feet to 43.3 feet. At the summit there is a cut 65 feet deep and 1¼ miles long, while there is another on this stretch 80 feet deep and 1,000 feet long. Three cutoffs between Howell and Dana necessitated the handling of 5,400,000 cubic yards of material. The next stretch of relocation saved 1.44 miles and involved the building of 42.83 miles of new track, the maximum grade being reduced from 70.22 feet per mile to the standard maximum. About half a mile is saved on the next cutoff, which is 10.64 miles in length, the maximum grade being reduced from 66.67 to the standard. On the new line, three miles west of the Green River, which follows the cliffs of the Union Bluffs of



Removing the Old Dale Creek Bridge.



Fish Cut, Green River—Bryan Cutoff; Showing the Old and New Lines.



Constructing One of the Great Fills.



Photographs by J. E. Stimson.  
West Entrance to the Aspen Tunnel.



Dale Creek Fill; Buford-Laramie Cutoff. Height of Fill, 120 Feet; Amount of Material, 500,000 Cubic Yards.

**THE RELOCATION OF THE UNION PACIFIC RAILROAD.**

sections of the line between Cheyenne and Ogden on which the old line has been abandoned and an entirely new line built. In a distance of 512 miles, measured on the old line, 158 miles of new road have been constructed with a saving of 30.47 miles in distance. In addition to this reduction there has been established a standard maximum grade of 43.3 feet to the mile over a stretch of the road where formerly grades as high as 68 to 97.7 feet per mile existed. Moreover, the maximum curvature has been reduced from 6 deg. to 5 deg., 4 deg., 3 deg., and on one or two locations as low as 1 deg. The result of this work will be a saving in the amount of

line is 0.37 of a mile greater; but the object aimed at was the reduction of the grade, which has been brought down from 97.7 feet per mile to the ruling grade of 43.3 feet per mile. In this division are three very high fills, the largest of which is Lone Tree Creek, which is 130 feet high, 300 feet in length and contains 350,000 cubic yards of material. The Dale Creek fill, as shown in the accompanying illustrations, is 120 feet high, and contains 500,000 cubic yards. The tunnel at the summit is excavated for 1,800 feet through solid granite. Change of location caused the abandonment of the well-known Dale Creek trestle bridge, 130 feet high and 650 feet long, which is shown in one of

the Green River, is what is known as the "Fish Cut." The new line, as shown in the accompanying illustration, was cut out of the side of the bluff, and here was involved the heaviest rock work in open cut on the whole line. The next cutoff is 21.6 miles in length, and it saves 9.56 miles in distance, the grades being reduced from 68.6 feet per mile. On this cutoff is the Aspen tunnel, 5,900 feet in length.

The new track will be laid throughout with 80-pound steel rails: Tie-plates have been used on all curves of 3 deg. and over, while the entire road from Cheyenne to Green River has been ballasted with disintegrated granite ballast.