

LARAMIE-POUDRE TUNNEL.

Location: Home, Colo.

Purpose: Irrigation.

Cross-section: Rectangular.

Size: 9½ feet wide by 7½ feet high.

Length: 11,306 feet.

Character of rock penetrated: Close-grained red and gray granite.

Type of power: Hydraulic at the east end, electric at the west.

Ventilator: Pressure blower.

Size of ventilating pipe: 14 and 15 inches.

Drills: 3 pneumatic hammer.

Mounting of drills: Horizontal bar.

Number of holes per round: 21 to 23.

Average depth of round: 10 feet at first, 7 to 8 feet later.

Number of drillers and helpers per shift: 3 drillers, 2 helpers.

Number of drill shifts per day: 3.

Explosive: 60 per cent. gelatine dynamite, with some 100 per cent. in the cut holes.

Number of muckers per shift: 6.

Number of mucking shifts per day: 3.

Type of haulage: Mules.

Wages: Drillers \$4.50, helpers \$4, muckers \$3.50, blacksmiths \$5, drivers \$4.50, dumpmen \$3.50.

Maximum progress in any calendar month: 653 feet, March, 1911.

Average monthly progress: 509 feet (for the 16 months when complete plant operated).

Special feature: Inaccessibility; the tunnel was located about 60 miles from the nearest railroad siding, and the roads were mountainous and very steep in places.

Cost of Driving 11,306 Feet.

	Cost per foot of tunnel.
Superintendents and foremen	\$ 1.50
Drilling	4.47
Mucking and loading	4.92
Tramming and dumping	4.63
Track and pipe47
Power house35
Blacksmithing84
Repairs47
Bonus to workmen	1.75
Maintenance of camps, buildings and fuel62
Machinery repairs12
Air drills and parts	1.33
Picks, shovels and steel84
Explosives	4.50
Lamps and candles42
Oil and waste38
Blacksmith supplies53
Liability insurance81
Office supplies, telephone and bookkeeping86
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	\$29.81
Permanent equipment (less approximately 10 per cent. salvage)	9.73
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	\$39.54

The permanent equipment included power plant, camp buildings and furnishings, pipes, rails, etc.

PRESERVATIVE TREATMENT OF POLES FOR LINE WIRES.

THE normal yearly production of poles in the United States is about 2,750,000, and to-day there are, approximately, over 50,000,000 poles supporting wires, either telephone, telegraph, light, or power. It is only of recent years that the pole user could be induced to take the precaution of preserving his timber.

In the last few years, prompted by their increased price, there is hardly a pole set without the owner's having some idea of preserving it. He begins to compare what he or his predecessor formerly paid for a pole with the present price, hence he begins to figure how to stop the expense of replacing rotten poles.

Since the records obtained in the past years show what ingredients remain in treated timbers the greatest period of time, it is natural to conclude that a good preservative should contain as great an amount of these ingredients as it is possible to obtain. The impregnating process, while one of the oldest methods known, is yet in its infancy. The records referred to, however, are based on timbers which had been treated with a tar oil under pressure. This method, if properly used, is frequently so expensive that the additional cost makes its use prohibitory.

It is the high boiling oils of coal tar which preserve timber, because that is what was obtained by subjecting the preserved timbers to dry distillation. The records do not show whether or not these high boiling oils originally contained any neutral, such as paraffin or similar oils, which have not as yet been proven germicidal.

The average tar oil obtainable, which is forced into timber under pressure, contains from 15 to 35 per cent. oil distilling above 300 degrees centigrade. Hence, if an oil that contained 35 per cent. distilling above 300 degrees centigrade, at most, which had been injected into the timber showed such excellent results, it is reasonable to suppose that a lesser amount of oil containing proportionally a greater per cent. of distillate above 300 degrees centigrade will bring good results when properly applied.

It is important for the one who supposes petroleum to be a preservative to exercise much care in the selection of the petroleum because it may prove an unwise form of economy, as it has repeatedly.

In 1900 the C-A-Wood-Preserver Company began directing attention to the value of high boiling tar oils as against the offered "secret" or "patented" process in connection with preservatives. Since scientific investigations by the government and others have substantiated these theories and arguments, some are attempting to use preservatives which are the high boiling portions of crude petroleum. These mislead the chemist unless he make the sulphonation test. The company mentioned, in 1886, sold one of the first barrels of coal tar distillate that came to America. This product, which was intended for the superficial method, distilled only 75 per cent. above 300 degrees centigrade. Eleven years afterward this was increased to 85 per cent. and during the summer of 1909 to 92 per cent. This was the highest mark reached so far and it required special machinery to produce it.

It is practically impossible to produce a successful oil distilling more than 92 per cent. above 300 degrees centigrade according to the United States Forest Service method of analysis, as it would solidify at normal temperature if it were free from petroleum residues or similar oils. Some tars will distill much more than 92 per cent.