layers were supplied either by pack bullocks and animals carrying water in skins or by carts filled with casks, but this mode of supply was known from the first to be so difficult that the novel expedient was resorted to of preparing a soft bed of earth for the sleepers by ploughing the hard saline crust of the desert instead of throwing up an artificial embankment. The bullocks engaged on this work came from the remote and scattered villages along the waterbreaks on either side of the line, and it was customary for these animals to work the whole of one day without water, and then to spend the next few days in going to and returning from their homes where, doubtless, they took in a good supply of food and water. Of course, now the line is laid, and water can be obtained by train, the earth works are being raised to a suitable height in more orthodox fashion. Whilst on the subject of bullocks, a curious fact may be mentioned that owing to the comparatively intense cold of the nights on the desert as compared with the days in the cold season, the carting bullocks with characteristic obstinacy, refused to drink water except in the very heat of the day, and this action on their part absolutely necessitated the arrangement of train time bills as above described. For housing the men engaged on the plate-laying, the first proposal of the Superintendent of Works, was that they should live in a train of wagons or more properly speaking in consideration of the vast number of native workmen which were required, that the men should sleep under large awnings spread out at night, and attached to and carried by a train of wagons which formed one gigantic ridge pole. The central wagons in this arrangement would be used in part as stores, hospitals shops, for the sale of food and liquor, and as receptacles for the men's clothes, cooking poles, &c., during the day whilst the awnings were furled, and whilst the whole structure was being propelled along so much of the railway as had been laid during the day. It turned out, however, that owing to caste and other native prejudices, their plan did not offer sufficient advantages to warrant its being enforced on a discontented and nervous mob, ever on the alert, to raise the cry that they had been lead into the desert only to be sacrificed for what they deemed the new fangled whim of the governing race. And, indeed, when all these things are considered, it is an extraordinary marvel that a compact body of less than twenty Europeans of all grades should have succeeded as they did in leading five thousand undisciplined natives through a series of hardships and risks, when the slightest failures of many complex arrangements might have resulted in some frightful catastrophe such as the massacre of the leaders.

As to the actual plate-laying, there is little of novelty to record. There is, as it is well known, a limit to the amount of work which may possibly be done on a single face, owing to the fact that each rail requires to be linked to that last laid, and that it is impossible to begin at several places at once without finding that the gaps between the different sections are either too long or too short to be filled exactly by the length of a rail. Of course it is quite feasible in many cases where sea or river carriage is available, and still more so where the railway made connects two different systems already established. But in this instance the nearest water communication would be the Caspian, and there was, in fact, no access for materials except from the further end of the line, of any kind; and the railway itself was the only means of getting to the end of it. This being so it is justly claimed that the present, viz., the Rocky Sibi Section of the Sukkur and Quetta Railway is by far the most rapid piece of railway construction on record, for while the engineers laid one hundred and thirty-four miles of road in one hundred and one consecutive days, inclusive of ten days occupied in workmen's strikes and native religious holidays, it is clear that, with an equally strong party working from the other end, the whole could have been completed in half the time, or taking the astounding result that the last sixty-two miles were laid from one end in thirty-one consecutive days, viz., from noon of the 14th of December to noon of the 14th January, we might, with equal energy and skill, working from both ends have seen one hundred and thirty-four miles of railway laid down and traversed by trains in the course of a single calendar month. In the parallel case of the Union Pacific Railway, which, as it is known, connects the eastern and western railway systems, there was ample access of material from both ends, and moreover the rails used are understood to have been the flat-footed Vignoles sections which is simply rivetted to the wooden sleepers without the intervention of either chairs or keys. Indeed it is highly probable that the eight-four pound rail and thirty pound chairs scraped together from the old-fashioned surplus stores of all the railways in India, and used in the present case, weighed, yard for yard, nearly double the amount of iron in any previously rapidly constructed railway. It should be remembered also, and fully borne in mind, that on the railway now under notice the changes from one style of material to another, involved inexperienced workmen—all natives—very serious delays, and the only wonder is that rails and other iron work from seven different sources were collected and utilized with such amazing rapidity and such extraordinary results. Not to mention the fact in the last place, that the nearest depot at which sleepers could be procured was six or seven hundred miles distant by railway, and that much of the timber was floated by raft from the far-off valleys of the Himayalan mountains, whilst part of it came immediately from England and doubtless primarily from Canadian forests.

It but remains to say that this section has been completed to, and opened at Sibi on the 15th January, 1880, on the broad gauge metre, the engineers are now actively engaged in pushing a lightly equipped mountain tramway, on the narrow metre gauge, along a series of narrow defiles, open passes and across extensive valleys *via* Harnal and Durgai to the table land, on which it will emerge near Quetta. It is is sanguinely hoped that less than two years will see this section of, miles in length, completed, and the locomotive ascending this tremendous incline on its way, eventually, to Kandahar.

HISTORICAL ANALYSIS OF RUK SIBI SECTION SUKKUR AND QUETTA RAILWAY.

1. Sir Louis Cavagnari, political President at Kabul, murdered 3rd September, 1879.
2. News received at Simla, Viceregal headquarters, on 7th Sept.
3. Decision regarding railway given by Viceregal Council on 10th.
4. Orders published on 13th
5. Staff of three or four engineers met at Sukkur on the 25th.
6. Sufficient men, tools and materials collected to commence operations at Ruk on the 5th October.
7. Shikapore 10¼ reached 13th October.
8. Jacobabad, 36 miles reached on 6th November.
9. Laborers struck work on 6th Nov. and refused to go beyond the limits of cultivation and civilization into the desert beyond. Ten whole days were occupied in this strike, during which no work was done. Pathans were ringleaders, and were so faint-hearted that.
10. The 5th mile was only reached on the 30th Nov.
11. First two months, 5th October to 5th December, the entire length laid was only 67 miles whilst.
12. When every thing was in full swing the very same length, viz, 67 miles exactly was laid in precisely one calendar month, 14th December to 14th January.
13. Best week's work amounted to 16 miles within a few yards
14. Best day's work amounted to 2 miles and nine-tenths.
15. Two slight accidents occurred in the last month; an engine and several waggons were derailed; diversions were made in each case and traffic resumed without many hours interruption and without loss of life
16. Mortality was much below the average, not exceeding two per cent. per mile per month.
17. Owing to excellent arrangements or the supply of vegtotables and blankets, scurvy and pneumonia the scourges of this part of India, were most entirely unknown.
18. Shelter was given by light reed screens and sheds 4 ft high roof 4½ ft. wide, placed in rows to windward, protecting the men from the cold wind These camps were pitched at every three miles, and were thus seldom occupied for more than two days, the fact to which much of their healthiness may be attributed.
19. One European surgeon and one native assistant sufficed for 5,000 men.
20. Ordinary campaigning tents were used by European officers. This camp was shifted every six miles.
21. Absence of rain was an unlooked for blessing to all concerned, both as regards comfort and rapidity of work Rain would have driven workmen to refuge of waggon awnings.
22. Two hundred feet on each side of railway made at public expense
23. Plate laying cost about one shilling per yard.
24. Cost of railway material unknown.
25. Cost of laying line exclusive of cost of materials—iron and wood—but including plate laying, that is to say cost of relaying permanent way is, to be safely workable, £500 per mile.
26. Ten locomotives and 300 waggons were employed on this section itself, besides those engaged on parent line in bringing up materials. This was all borrowed by Government from other Indian railways.
27. The railway Ruk Sibi section 131 miles in length, was opened at Sibi on the 15th January, 1880.
Congratulations from all quarters were received during the day.
28. May—attached.

W. HENNELL, Capt.
5th Regt. Bombay N. I.

Camp Harnal, Southern Afghanistan,
25th February, 1880.

N. B.—This paper was compiled with Mr. James Bell, the chief executive engineer of the line.