



Two-wagon train hauled by two mules, on the Patiala–Sunam line, with porters and military escort

## AN INDIAN “MIGHT-HAVE-BEEN”

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### Transient history of the Patiala State Monorail Trainway

SIXTY years ago, in Northern India, there was some fifty miles of a monorail system under the rather strange name of the Patiala State Monorail Trainway. By 1945, it was sufficiently forgotten for a short railway in the state of Nawanagar, working on the Skelton “Guideways” principle, to be claimed as India’s first monorail (“Indian India”, December, 1946, p. 40). It might have been almost wholly lost to history but for a fortunate chance, and but for a sad one, much more would be known. It was mentioned briefly by H. A. Robinson in an article in 1956 (*Model Engineer*, November 29, 1956) and J. R. Day and B. G. Wilson referred to the monorail in their book “Unusual Railways” (Frederick Muller, 1957). Colonel C. W. Bowles, who had built the line, was living in retirement at a great age, saw this paragraph, and sent some information and photographs to Mr. Day, who wrote an article about it (*Railway World*, February, 1962).

I saw this article while in India, and in due course went to Patiala, and, by the kindness of H.H. the Maharajadhiraj, was able to visit the archives, and also had the unexpected windfall of seeing the remains of locomotives and rolling stock. I was put in touch with Colonel Bowles, and an exchange of letters followed. On my return to England in 1966, I intended to visit him, but was held up for a week or two, and when I was at length due to go and see him, primed with many points to clear up, he fell ill and shortly afterwards died, at the age of 90.

I missed meeting a great character, and further information about the monorail, which only he had, died with him. This article tries to tell what now is known.

In about 1900, Mr. Bowles as a young engineer with a British firm, was laying out the site of the Bengal–Nagpur Railway works at Kharagpur in Bengal. As he was having trouble with the narrow-gauge contractors tracks, he tried, successfully as it turned out, the Ewing monorail system. In this simple arrangement, some 95 per cent. of the weight of a vehicle is taken on a single rail, and the rest on an additional wheel on an outrigger, running on the ground at the side of the track. A year or two later, he chanced to visit the Sikh State of Patiala, an irregular area of about the spread of Yorkshire, and now a part of Indian Punjab. He met the ruler, H.H. the Maharaja Sir Bhupinder Singh, a character several sizes larger than life, and the two took to each other at once; Bowles joined His Highness’s service, in due course becoming State Engineer.

Bowles applied his Kharagpur experience by building a 15-mile line of monorail from Sirhind on the North Western Railway to Alampur, and later to Morinda in British Punjab. One object of the line was to make use of the 560 Government mules maintained by the state, as, when there was no war anywhere, there was little for them to do. The line was built by the Bombay firm of Marsland & Price, which worked it, by

mule haulage, until 1917, when the working was taken over by the state, through a contractor. The track was of 18 lb. per yd. rail, clipped to iron sleepers 10 in.  $\times$  8 in.  $\times$   $\frac{1}{2}$  in. The 15 miles cost Rs. 70,000 (about £6,000). It was proposed to extend it to Rupar, but, as it turned out, the N.W.R. covered this instead, building a branch from Sirhind to Rupar, via Morinda, and extending it later to Nangal and the great Bhakra Dam. When the Rupar branch was completed the monorail was closed, on October 1, 1927.

The piece between Alampur and Morinda seems to have been closed a little earlier; there had been some rather petty financial wrangles between Patiala and the Foreign Office of the Government of India about the road-wheels wearing the road, and whether or not taxis, which were beginning to appear, should be allowed to compete. Bowles said it was closed in 1914 when the mules were withdrawn, but it seems clear from the correspondence in the archives that it must have started up again.

The only published information about this line, apart from the sources mentioned above, is in the 1908 edition of the *Imperial Gazetteer of India*, which briefly states "a monorail tramway opened in Feb. 1907 connects Basi with the railway at Sirhind". An ordnance map of about 1913 shows a tramway running along the west side of the road, with no mention that it was monorail. It seems to have attracted passengers; in a memorandum of October 2, 1908, found among Colonel Bowles's papers, and kindly lent me by Mrs. Bowles, it is stated that it carried 20,000 passengers in a month, the fare for the 15 miles being  $1\frac{1}{2}$  annas (about  $1\frac{1}{4}$ d.). Goods were carried at one anna per maund (80 lb.) for the same distance. There were some frustrations about the goods services; the station staff on the N.W.R. at Sirhind were hostile, as they had been getting a rake-off from the owners of bullock carts. However, things were promising enough for a proposed company, which was to take over

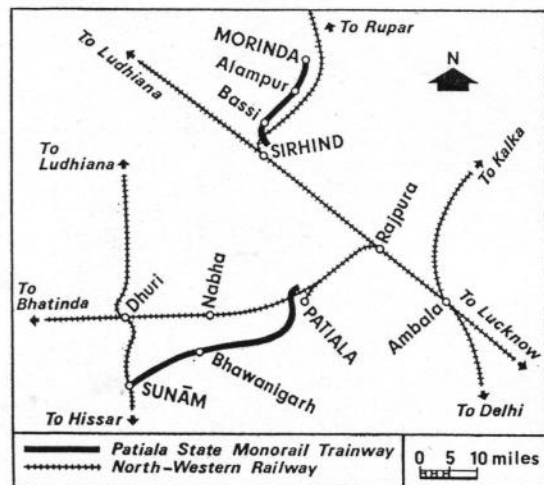


Photo: H. R. Ambler

Best preserved of the monorail locomotives in the Public Works Department shed at Patiala; behind it is the inspection coach

from Marsland & Price, to expect to make a 13 per cent profit. It looks however as if this company never functioned, as Marsland & Price was still running it in 1927.

The second, or "main" line, from Patiala City to Sunam on the Ludhiana-Hissar branch of the N.W.R., was a more ambitious affair, and is wrapped in much more mystery. The *Imperial Gazetteer* does not mention it, and it is not shown on the 1914 ordnance map. Nothing about it has been found in the archives, and the evidence that it existed lies in Colonel Bowles's letters to Mr. Day and myself, and in the 1908 memorandum mentioned above. According to Bowles, it started in a goods yard of the N.W.R. by Patiala Station, which is on a short terminal-spur to the south of the through line from Rajpura Junction to Bhatinda. This goods yard was then on the north side of the line, which the monorail crossed at a road level-crossing, the N.W.R. rails being notched to allow the grooved monorail wheels to cross. It then went through the walled city southwards to City Mandi, turned north to the Cantonment Lines, along the side of the main road to Bhawanigarh and thence Sunam. The memorandum states that in 1908 it was complete as far as Bhawanigarh, and that the Patiala Durbar had approved an extension to Sunam. Whether this was ever done is inconclusive: Bowles's letters are not explicit about it. What oral tradition there is now in Patiala City



Patiala State Monorail Trainway and connections with the North Western Railway

is that the extension was not made, and that there are still some mounds of earth where it had been planned.

Whether the line reached Sunam or not, it could not have lasted long. Bowles says "later the traffic changed to motors, and I removed the line". From the lack of mention of it in the 1908 *Gazetteer* and the 1914 survey, its whole life must have been between these dates. Why it should have been abandoned so long before the Sirhind line is strange. It does seem to have struck troubles from the beginning; wooden sleepers were used (12 in. or 15 in.  $\times$  1 in.  $\times$  4 in., about 3 ft. apart) instead of iron ones, and they were badly attacked by termites. There were also difficulties with a neighbouring state through which a short length of the road passed. Bowles says: "at about Mile 7, all the road, a building occupied by the Police, then a village and the H.T. electric posts and lines were claimed as being on Nabha territory". The map shows that at about this point the road did go out of Patiala territory, but not into Nabha. However, the political geography of the Phulkian States (Patiala, Jind, Nabha and so on) was such an extraordinary patchwork that anything would be possible. Patiala and Nabha were certainly on bad terms at one time. Bowles says: "alas, perhaps about 1912, the motor-road tongas and wagonettes took the passengers". The road seems to have been too good for the health of the monorail, and one's guess is that the rapidly-growing competition of road traffic made it not worth while to get over these other difficulties.

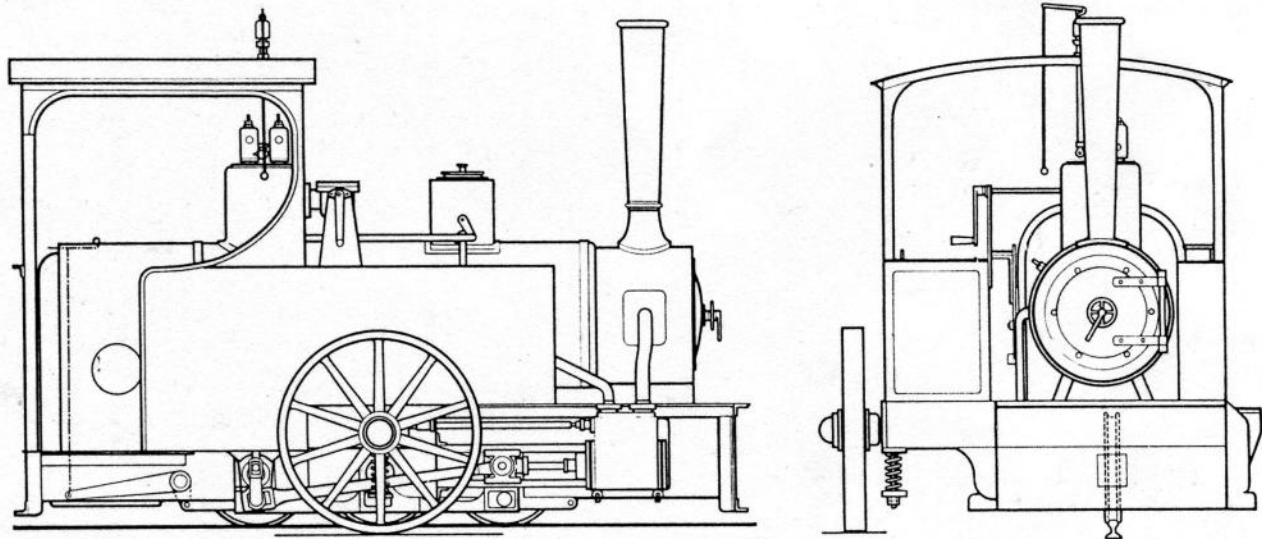
I did travel the whole lengths of the roads from Sirhind to Morinda and Patiala to Sunam, in the faint hope of meeting some traces of the monorail, but with the expected blank result. It is hard enough to trace the course of the Wantage Tramway, and to find traces of a monorail at the side of a road in the dead-flat terrain of the Punjab, after half a century, would have been

luck indeed. The stationmaster at Sunam had never heard of the monorail.

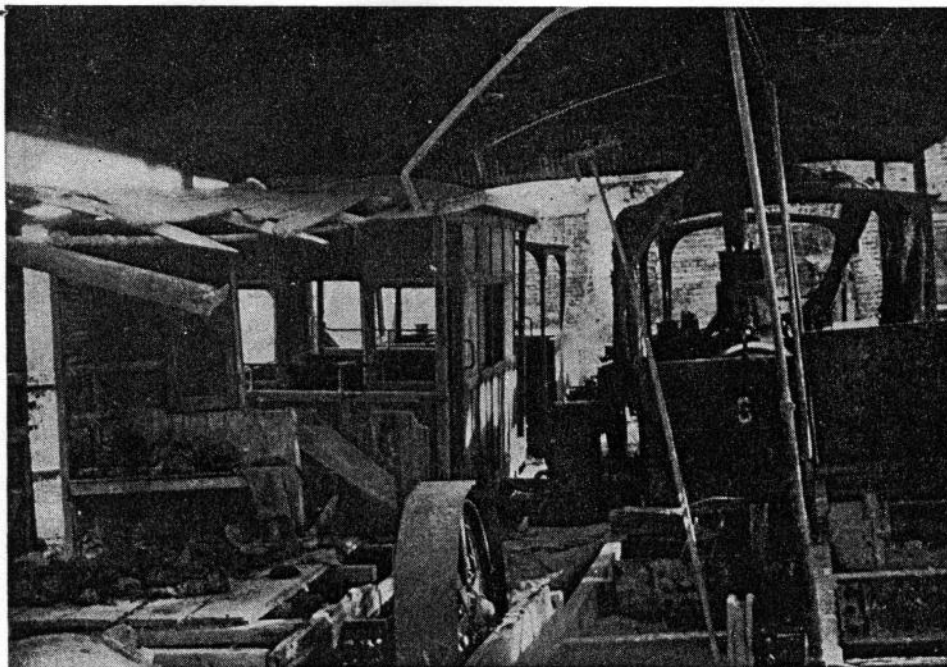
Although one of the reasons for building the P.S.M.T. in the first place was to make use of the mules, it was decided to have steam power available against the contingency of the mules being withdrawn. Four locomotives were accordingly made by the German firm of Orenstein & Koppel, at a cost of £500 to £600 each. The 1908 memorandum says that two were already in use and had proved satisfactory, and that an improved type was being ordered. The works numbers were consecutive, however, suggesting that the four were one batch. It was intended to use them on both lines, and there were negotiations with the N.W.R. about allowing locomotives into the station precincts at Sirhind, and with British Punjab about allowing them to Morinda. There is no evidence that they ran on the Sirhind line at all. Bowles says it was found that the engines were too heavy for the 18 lb. per yd. rail. He is clear, however, that steam trains did run between Patiala Station and City Mandi, although he does not say for how long. The distance is about a mile, and there is roughly this length of heavier rail (about 60 lb. per yd.) still stored in the yard at Patiala with the rest of the monorail equipment. One guesses that this short length was relaid with the heavier rail, and only this length used by regular steam trains: even this must have been pulled up before the 1913 survey.

#### Four locomotives

The four engines, two more or less complete, and two completely disassembled, with not much more than the frames left, are stored, together with a few coaches, in an open-sided shed in a Public Works Dept. yard in Patiala City, to which I was taken by Mr. R. N. Sharma. The yard still bears a notice "P.W.D. (Monorail)". The



Side and front elevation of Orenstein & Koppel 0-3-0 monorail locomotive for the Patiala-Sunam line



*Interior of the P.W.D. shed at Patiala; inspection coach on left; locomotives in background. Frame of dismantled locomotive in right foreground*

*Photo: H. R. Ambler*

shed was too closely packed to allow much of an examination of the engines, but it was possible to take a few photographs, and Lt.-Colonel F. von Goldstein, Headmaster of the Yadavindra Public School, Patiala, and Mr. K. Doraiswamy have had various points about them checked on the spot. Orenstein & Koppel has been unable at this stage to find any further details, but in about 1961 the firm did give Mr. Day some line-drawings, one of which, with his permission, is reproduced here.

The wheel arrangement was 0-3-0, the middle wheel, of 50 cm. (1 ft. 7½ in.) dia. being flangeless;

the other two had a double flange forming a groove 2.15 cm. deep. The wheelbase was 119 cm. (3 ft. 11 in.). The boiler, of 63 cm. dia., had its centre line offset by 3.5 cm. from that of the coupled wheels, and, with the firebox, extended to the rear of the cab, the fire-hole being on the right-hand side, and the cab extended to the right. Two outside cylinders, 13 cm. bore × 24 cm. stroke, drove the rear driving axle. The overall length of frame was 341 cm. (11 ft. 1 in.), the width being 138 cm. at the front and 165 cm. at the cab end. There was a side-tank on the left side and on the right a hinged receptacle, presumably for coal or wood. The faded finish looked like L.N.E.R. green.

### Rolling stock

The road wheel, 98 cm. dia., was set at 7 ft. from the rail. There is no evidence that it was powered, although in one of the dismantled engines there is a suggestive 1:2 chain reduction gear, which, however seems to have nothing to do with the road wheel, and to be some experiment. Bowles said that the road wheels wore the road and that modifications had to be made, but he does not say what these were.

Wagons were normally 8 ft. by 6 ft., with two 8 in. dia. rail wheels, and one road wheel; in 1908 there were 75, costing about £40 each. Passenger stock on the Sirhind line seems to have been open-sided two-wheelers with knifeboard seating; there were 15 of these in 1908. In the shed at Patiala, there were the remains of some more ambitious coaches, with bogies and two road wheels. One was a closed coach, with end-platforms, of normal light railway type; the other, which had once had a wash-basin, was



*Photo: H. R. Ambler*

*Derection outside the P.W.D. shed at Patiala, with decayed monorail trainway carriages, attendant sacred cow, and watchman's "charpoy" (bed) in foreground*

obviously a private saloon, probably Colonel Bowles's inspection saloon. Bowles says that there were also bogie goods wagons, 30 ft. long, with

two road wheels, and that some were converted to passenger use, by fitting transverse benches. It must have been such vehicles as these that figured in an episode when the Amir of Afghanistan was paying a visit, and it fell to the P.S.M.T. to transport a large number of his bodyguard to an Afghan shrine near Sirhind, where the Afghan frontier once came. The troops felt it unmilitary to sit, so stood at attention on the benches—until the train started, with remarkable results. "A fallen army" was Bowles's comment.

One feels that the monorail was a fine might-have-been which failed because it was a few years too late. It solved the problem of finding something better than the bullock-cart, just before the problem was solved better in a different way. The Sirhind line was just in time to be a success for a few years. The Sunam line was two years later and, with its unexpected difficulties, this was critically too late. The dismantling of two of the engines suggests that steam traction was written off once it was found that it would need heavier rail. If someone had thought of the Ewing idea thirty years earlier, there might have been a network of steam monorails feeding the railways all over rural India.

### Continued interest

It seems that the Maharaja continued to be interested in possibilities of monorail systems; there is a tantalising passage in one of Bowles's letters, in which he says that he was drafted on to various people "who had monorails with wonderful wire ropes across gorges and 'dynamican' spinning balancing affairs which got into a sag at the centre and so fell down in due course". One wonders if he did actually try out a gyroscopic vehicle with this sad result, or whether it was just his surmise of the sort of thing that might happen with them. The 1908 memorandum states: "there is no reason to suppose that Brennan's gyroscopic invention or the Benard road train will compete with it" (that is, the Ewing system).

One thing which emerges from the correspondence is the great impression which the Maharaja made on Colonel Bowles, himself an obviously large-size character. Thirty years after his death, Bowles says: "a wonderful ruler, and, moreover, a wonderful friend. I feel that loss every day of my life". An elderly Indian who had also served under him spoke to me of him in similar terms. His Highness died suddenly in 1935, and Bowles, who was on home leave at the time, did not have the heart to return to India; an incidental result of this was the loss of photographs of the monorail among the effects which remained behind.

There is some hope that one of the locomotives will be preserved in the Birla Technological Museum in Calcutta, and another in a museum at Patiala itself. If this happens, more should come to clear light about their construction. Meanwhile they sleep on where they were put to bed nearly forty years before the end of the British Raj and of the Princely State of Patiala.