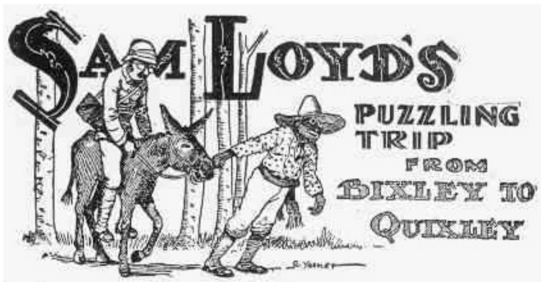
Bixley to Quixley Puzzle

20 May 2021

Jim Stevenson



I braved another attempt at a Sam Loyd puzzle ([1]).

Here is a pretty problem which I figured out during a ride from Bixley to Quixley astride of a razor-back mule. I asked Don Pedro if my steed had another gait, and he said it had but that it was much slower, so I pursued my journey at the uniform speed as shown in the sketch.

To encourage Don Pedro, who was my chief propelling power, I said we would pass through Pixley, so as to get some liquid refreshments; and from that moment he could think of nothing but Pixley. After we had been traveling for forty minutes I asked how far we had gone, and he replied: "Just half as far as it is to Pixley." After creeping along for seven miles more I asked: "How far is it to Quixley?" and he replied as before: "Just half as far as it is to Pixley."

We arrived at Quixley in another hour, which induces me to ask you to figure out the distance from Bixley to Quixley.

I was disconcerted by what I thought was extraneous information and wondered if I had misunderstood his narrative again.

My Solution

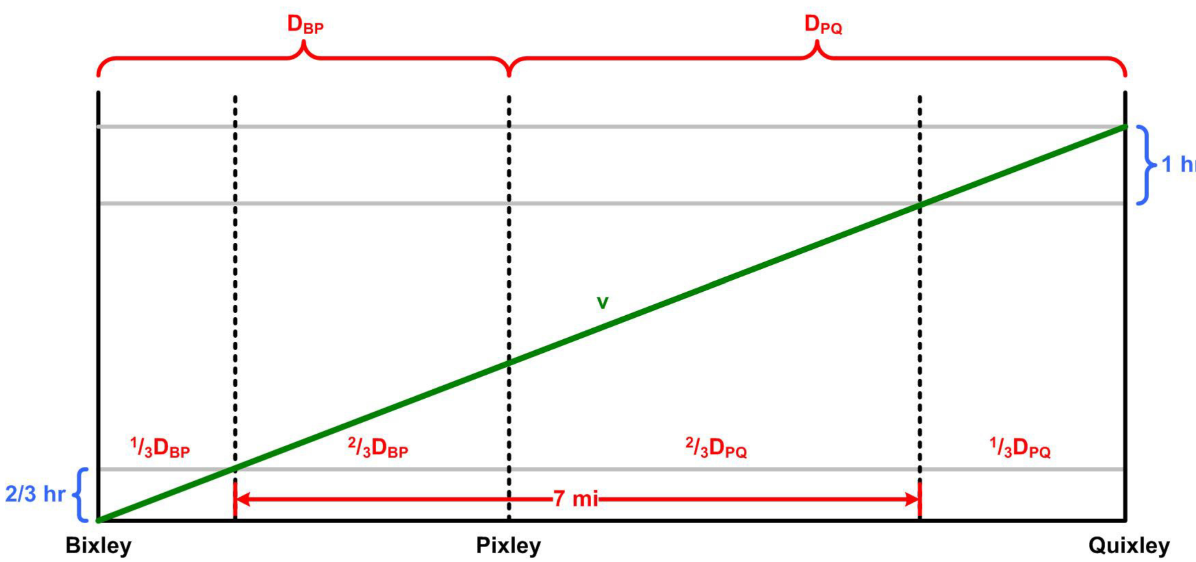


Figure 1

Figure 1 shows a space-time diagram of the problem in terms of hours rather than minutes. As usual, Loyd is a bit deceptive with his phrase "After creeping along for seven miles more", since it implies a continuous effort. But the distance to Quixley and the phrase "I said we would pass through Pixley" implies that the troop had already passed through Pixley (and made whatever stop) at the end of the seven miles.

I have subdivided the distance between Bixley and Quixley into the distance from Bixley to Pixley (D_{BP}) and from Pixley to Quixley (D_{PQ}). We see immediately that

$$7 = {}^{2}/_{3}\, D_{BP} + {}^{2}/_{3}\, D_{PQ} = {}^{2}/_{3}\, (D_{BP} + D_{PQ})$$

so that the distance between Bixley and Quixley is

$$D_{BP} + D_{PQ} = 21/2 = 10.5 \text{ miles}$$

We did not need the actual values for the times. Just to make sure everything was consistent, I added the rest of the times to the diagram (Figure 2). Since the mule was plodding at a constant rate *v*, it took him twice as long to cover the distances to Pixley as shown. So the whole trip took 5 hours of travel (not counting a stop at Pixley for "refreshments"). But in fact, it doesn't really matter if the mule varied his gait—the statements about distance are independent of time.

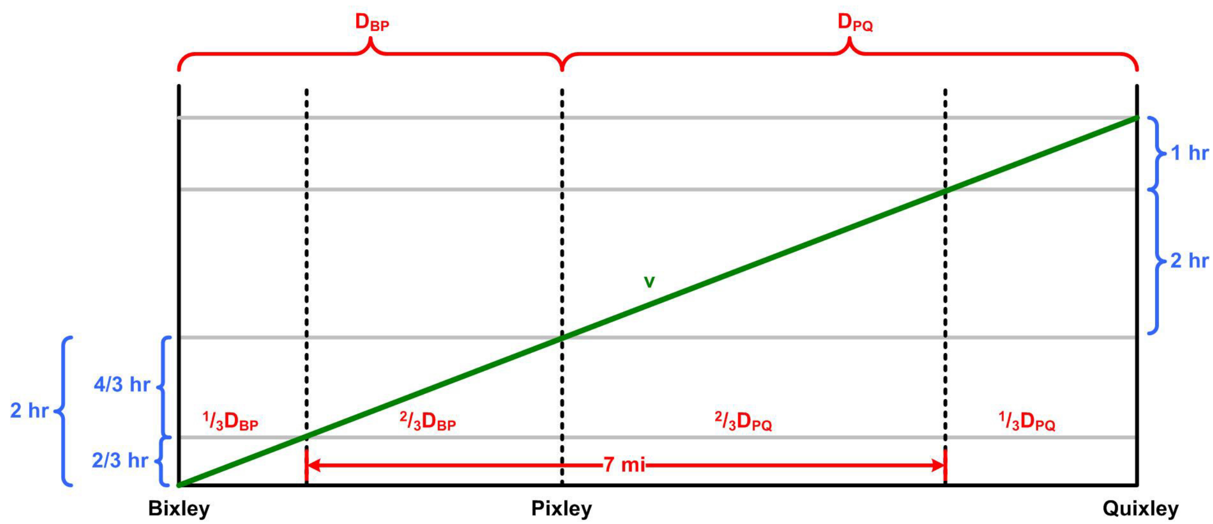


Figure 2

Loyd Solution

Loyd's solution ([2]) is more convoluted and reasons from the times (in minutes), and so depends on the constant gait of the mule.

After traveling for forty minutes the guide stated that they had gone just half the remaining distance to Pixley, so it is clear that the time between Bixley and Pixley consumed 120 minutes. Later on between Pixley and Quixley he stated they were just half as far away from Quixley as from Pixley. Then they reached Quixley in an hour, which makes it clear that they consumed 180 minutes between Pixley and Quixley. Thus we have the time of the whole journey as five hours. It required 200 minutes for the seven-mile stretch, so the distance covered between Bixley and Quixley in 300 minutes must have been ten and a half miles.

Again I marvel at the seeming throw-back to pre-symbolic algebra days of the Middle Ages with Loyd's verbal solution without diagrams or algebra. I find it harder to understand.

References

[1] Loyd, Sam, *Cyclopedia of Puzzles*, Lamb Publishing, New York, 1914. p.220

[2] ———, p.368