The Riv’

The MSS “River of Stars is bound for Dinwoody Poke, Jupiter space. Her fusion engines have been ruined in a freak accident. The ship has 19 days to rebuild the engines, or she will pass the ‘balk line’, the point of no return, and drift endlessly away from settled space.

 The repairs go slowly, but the ship's Engineer is a master of improvisation, and no one doubts he will fix the engines in time. No one, that is, but the oldest magsailors, who remember that the River of Stars still has her original sails, unused for decades. They decide to fix them up, just in case.

“I don’t understand,” Akhaturian said one day and, as it was the phrase with which he was most likely to begin a sentence, no one in the common room paid him any attention at first. They were, all four of them, bone-tired from having replaced the lithium valve and, like a puddle on sunbaked earth, the question needed time to soak in. Finally, although she hesitated to ask a question with so many possible answers, Okoye said, “What don’t you understand?” “Everything,” said Evermore, doing the kid’s answering for him. DeCant, leaping to Akhaturian’s defense, gave the older boy a scowl and said, “He’s new,” which was not quite the same as denying the charge.

 “I mean about the balk line,” Akhaturian said. “Why do the engines have to be back on line before then? At the speed we’re going, we’ll actually reach Jupiter sooner than we planned.”

 “Dummy,” said Evermore, “That’s just the problem.”

 “You should ask Mr. Corrigan,” Okoye suggested. “He knows navigation the best.”

 “You see, we’re moving between two fixed points…” Mr. Corrigan explained when Akhaturian had tracked him down to the bridge, where he was computing the ship’s position by dead reckoning. (This was a procedure in navigation akin to book inventory in materials management. It was a number that ought to be true, but seldom was.)

 “But Jupiter isn’t a fixed point!” Akhaturian protested. “And neither is Achilles. They’re both moving at, uh, at fourteen kiss.”

 Corrigan laughed. It was always more difficult to explain such matters to the wellsprung than to the spaceborn. “We only *call* them fixed points, because they don’t move *relative to each other*. Achilles sits in a stable cusp which is always the same distance ahead of Jupiter. We boost partway, coast for a while to save on boron, flip, then brake. But it takes the same energy to slow us down as to speed us up, so the de-boost has to start at the balk line – in our case, at two hundred and sixty-three million klicks out – or we’ll be going too fast to enter HoJO, that’s High Jovian Orbit – unless,” and this he could not help but add, “we find an additional source of deceleration.”

 Corrigan took Akhaturian through the calculations, step-by-step; that is, he held an extended conversation with Ship in its avatar as navigational computer. The Second Officer conceptualized the problem and the neural net did all the donkey work. Akhaturian learned how to calculate velocities and bearings and boron usage. Then, Corrigan let the Least Wrangler run practice problems, taking an imaginary *River* back and forth among Jupiter, the Trails, and the Leads. Akhaturian rather enjoyed it. “I am the captain!” he declared at one point and Corrigan smiled (or tried to).

 “It takes more than knowing how to point the ship to be captain,” he said. “It takes knowing where and why to point it.”

“Hey,” said Akhaturian when he had returned to the wranglers’ common room, “I bet you don’t know why *The Riv’* is shaped like a disk.”

 Evermore was taking apart his belt phone. There was nothing wrong with it. He was just curious how it was put together. “Of course, I know,” he told the Least Wrangler, without looking at him.

 “Oh.”

 Okoye dimmed her screader and looked up. “I don’t know. Why don’t you tell me?”

 Akhaturian bounced over to her side and, inevitably, decant joined him there. Unnoticed by any but Okoye, Evermore shot them a look that she recognised as one of envy, though of whom he was envious she was not sure. “It’s because *The Riv’* used to be a magnetic sail,” Akhaturian said. “Mr. Corrigan told me. The mast on the foreward hull? It used to anchor a super-loop *sixty-four kilometres* in diameter, way back when. They made the ship so it would fit inside the shape of the magnetic field the sail created, because the charged particles – you know, the solar wind – they sleet off the field – Mr. Corrigan says that gasses in the field can glow with different colors – but there’s two hot spots – the auroral spots, Mr Corrigan called them – where the particles curve in, just like on Jupiter – and on Earth too I suppose – and they didn’t want any part of the ship to sit in the hot spots of the ‘vanilla’ belts. That’s why the mast is only a couple hundred metres long. So the ship stays well inside.”

 Okoye considered that this entire pronouncement had been delivered without a second intake of breath and smiled at the lad. “That’s very interesting,” she said, and did not correct his pronunciation of “Van Allen Belts.”

 Afterwards, Evermore approached Okoye and asked her if what the boy had said was true and, on being told that it was, nodded sagely. “Yah,” he said, “that’s what I would have guessed, but you’ve been on board more years than the rest of us. I’m surprised you didn’t know.”

Portions extracted from “The Wreck of the River of Stars” by Michael Flynn, 2003, Tor, p96-98