

Late that afternoon Nadia tilted the nose of dirigible down and circled into the wind, dropping until they were within ten meters of the ground and then releasing their anchor. The ship rose, jerked on its line, and settled downwind of the anchor, tugging at it like a fat kite. Nadia and Arkady twisted down the length of the gondola, to what Arkady called the bomb bay. Nadia lifted a windmill onto the bay's winch hook. The windmill was a little thing, 5 a magnesium box with four vertical vanes on a rod projecting from its top. It weighed about five kilos. They closed the bay door on it, sucked out the air, and opened the bottom doors. Arkady operated the winch, looking through a low window to see what he was doing. The windmill dropped like a plumb, and bumped onto hardened sand, on the southern flank of a small unnamed crater. He released the winch hook and reeled it back into the bay, and closed the bomb doors.

10 They returned to the cockpit, and looked down again to see if the windmill was working. There it stood, a small box on the outside slope of a crater, somewhat tilted, the four broad vertical blades spinning merrily. It looked like an anemometer from a kid's meteorology kit. The heating element, an exposed metal coil that would radiate like a stovetop, was on one side of the base. In a good wind the element might get up to two hundred degrees centigrade, which wasn't bad, especially in that ambient temperature. Still. . . . "It's going to take a lot of those to make any 15 difference," Nadia remarked.

"Sure, but every little bit helps, and in a way it's free heat. Not only the wind powering the heaters, but the sun powering the factories making the windmills. I think they're a good idea."

They stopped once more that afternoon to set out another one, then anchored for the night in the lee of a crisp young crater. They microwaved a meal in the tiny kitchen, and then retired to their narrow bunks. It felt odd to rock 20 on the wind, like a boat at its mooring: tug and float, tug and float. But it was very relaxing when you got used to it, and soon Nadia was asleep. [...]

After that winds blew from the south for several days. They caught a glimpse of Cassini, another great old crater, and passed over hundreds of smaller ones. They dropped several windmills per day, but the flight was giving them a stronger sense of the size of the planet, and the project began to seem like a joke, as if they flew over Antarctica and 25 tried to melt the ice by setting down a number of camping stoves. "You'd have to drop millions to make any difference," Nadia said as they climbed up from another drop.

"True," Arkady said. "But Sax would like to drop millions. He's got an automated assembly line that will just keep churning them out, it's only distribution that is a problem. And besides, it's just one part of the campaign he has in mind." He gestured back toward the last arc of Cassini, inscribing the whole northwest. "Sax would like to bang out 30 a few more holes like that one. Capture some icy moonlets from Saturn, or from the asteroid belt if he can find any, and push them back and smash them into Mars. Make hot craters, melt the permafrost—they'd be like oases."

"Dry oases, wouldn't they be? You'd lose most of the ice on entry, and have the rest disappear on contact."

"Sure, but we can use more water vapor in the air."

"But it wouldn't just vaporize, it would break into its constituent atoms."

35 "Some of it. But hydrogen and oxygen, we could use more of both."

"So you're bringing hydrogen and oxygen from Saturn? Come on, there's lots of both here already! You could just break down some of the ice."

"Well, it's just one of his ideas."

40 "I can't wait to hear what Ann says to that." She sighed, thought about it. "The thing to do, I suppose, would be to graze an ice asteroid through the atmosphere, as if trying to aerobrake it. That would burn it up without breaking the molecules apart. You'd get water vapor in the atmosphere, which would help, but you wouldn't be bombing the surface with explosions as big as a hundred hydrogen bombs going off all at once."

Arkady nodded. "Good idea! You should tell Sax."

Annotations: 12 anemometer: instrument for measuring wind force and velocity 14 ambient: surrounding 18 lee: that side of the crater that provides shelter from the wind 40 graze: rub away by friction; aerobrake: use atmospheric drag to reduce the velocity of an object

Assignments:

- 1) Use (all) clues in the text to prove that the mission carried out by the crew is set on Mars. (Avoid repetitions in answer 2 by careful planning.)
- 2) Put the technical details of the mission (as they are described in the text) into the larger context of terraforming measures on Mars (pointing out, among other things, the intended effects).
- 3) K. S. Robinson is no scientist. Should the job to initiate and define Mars missions be left to the aeronautic community (NASA, ESA etc.)? (Relate your answer to the text above. Do not forget to think of the input that can/should come from non-professionals.)