For the Birds

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Charles Modine, despite the fact that he was in his late thirties, and in perfect health, had never been in space. He had seen space settlements on television and had occasionally read about them in the public prints but it went no further than that.

To tell the truth, he was not interested in space. He had been born on Earth, and Earth was enough for him. When he wanted a change of environment, he turned to the sea. He was an avid and skilled sailor.

He was therefore repelled when the representative of Space Structures, Limited, finally told him that, in order for him to do the job they were asking him to do, he would have to leave Earth.

Modine said, “Listen. I’m not a space person. I design clothes. What do I know about rockets and acceleration and trajectories and all the rest of it?”

“We know about that. You don’t have to,” said the other, urgently. Her name was Naomi Baranova and she had the queer, tentative walk of someone who had been in space so long she wasn’t sure what the gravitational situation was at the moment.

Her clothes, Modine noted with some irritation, functioned as coverings and as little else. A tarpaulin would have done as well.

“But why need I come out to a space station?” he said.

“For what you know. We want you to design something for us.”

“Clothes?”

“Wings.”

Modine thought about it. He had a high, pale forehead and the process of thought always seemed to flush it somewhat. He had been told that at any rate. This time, if it flushed, it was partly in annoyance. “I can do that here, can’t I?”

Baranova shook her head firmly. She had hair with a dark reddish tinge that was slowly being invaded by grey. She didn’t seem to mind. She said, “We want you to understand the situation, Mr Modine. We’ve consulted the technicians and the computer experts and they’ve built the most efficient possible wings, they tell us. They’ve taken into account stresses and surfaces and flexibilities and manoeuvrabilities and everything else you can imagine -but it doesn’t help. We think perhaps a few frills—”

“Frills, Ms Baranova?”

“Something other than scientific perfection. Something to rouse interest. Otherwise, the space settlements won’t survive. That’s why I want you there; to appreciate the situation for yourself. We’re prepared to pay you very well.”

It was the promised pay, including a healthy retainer, win or lose, that brought Modine into space. He was no more money-mad then the average human being, but he was not money-insensitive either, and he liked to see his reputation appreciated.

Nor was it actually as bad as he had expected. In the early days of space travel, there had been short periods of high acceleration and long cramped periods in small modules. Somehow that was what Earth-bound people still thought of in connection with space travel. But a century had passed and the shuttles were commodious, while the hydraulic seats seemed to sop up the acceleration as though it were nothing more than a coffee spill.

Modine spent the time studying photographs of the wings in action and in watching holographic videotapes of the flyers.

He said, There’s a certain grace to the performance.” Naomi Baranova smiled rather sadly. “You’re watching experts—athletes. If you could see me trying to handle those wings and managing to tumble and sideslip, I’m afraid you would laugh. And yet I’m better than most.”

They were approaching Space Settlement Five. Its name was Chrysalis, officially, but everyone called it Five.

“You might suppose’, said Baranova, “that it would be the other way around, but there’s no feeling of poetry about the place. That’s the trouble. It’s not a home; it’s just a job, and it is hard to make people establish families and settle down. Until it’s a home—”

Five showed up as a small sphere, far away, looking much as Modine had seen it on television on Earth. He knew it was larger than it looked, but that was only an intellectual knowledge. His eyes and his emotions were not prepared for the steady increase in size as they approached. The spaceship and he dwarfed steadily and, eventually, they were circling an enormous object of glass and aluminium.

He watched for a long time before he became aware that they were still circling. He said, “Aren’t we going to land on it?”

“Not that easy,” said Baranova. “Five rotates on an axis about once in two minutes. It has to in order to set up a centrifugal effect that will keep everything inside pressed against the inner wall and create an artificial gravity. We have to match that speed before we can land. It takes time.”

“Must it spin that quickly?”

“To have the centrifugal effect mimic Earth-strength gravity, yes. That’s the basic problem. It would be much better if we could use a slow spin to produce a tenth normal gravity or even less, but that interferes with human physiology. People can’t take low gravity for too long.”

The ship’s speed had nearly matched the rotation period of Five. Modine could clearly see the curve of the outer mirror that caught the sunlight and with it illuminated Five’s interior. He could make out the solar power station that supplied the energy for the station, with enough left over for export to Earth.

And they finally entered at one of the poles of the sphere and were inside Five.

Modine had spent a full day on Five and he was tired—but he had, rather unexpectedly, enjoyed it. They were sitting now on lawn furniture—on a wide stretch of grass—against a vista of suburbia.

There were clouds overhead—sunshine, without a clear view of the Sun itself- a wind—and, in the distance, a small stream.

It was hard to believe he was on a sphere floating in space in the Moon’s orbit, circling Earth once a month. He said, “It’s like a world.”

Baranova said, “So it seems when you’re new here. When you’ve been here a time, you discover you know every corner of it. Everything repeats.”

Modine said, “If you live in a particular town on Earth, everything repeats too.”

“I know. But on Earth you can travel widely if you wish. Even if you don’t travel, you know you can. Here you can’t. That’s—not so good; but it’s not the worst.”

“You don’t have the Earth’s worst,” said Modine. “I’m sure you don’t have weather extremes.”

The weather, Mr Modine, is indeed Garden of Edenish, but you get used to that.—Let me show you something. I have a ball here. Could you throw it high up, straight up, and catch it?”

Modine smiled. “Are you serious?”

“Quite. Please do.”

Modine said, “I’m not a ball player, but I think I can throw a ball. I might even catch it when it comes down.”

He threw the ball upwards. It curved parabolically, and Modine found himself drifting forwards in order to catch it, then running. It fell out of reach.

Baranova said, “You didn’t throw it straight up, Mr Modine.”

“Yes, I did,” gasped Modine.

“Only by Earth standards,” said Baranova. “The difficulty is that what we call the Coriolis force is involved. Here at the inner surface of Five, we’re moving quite rapidly in a great circle about the axis. If you throw a ball upwards it moves nearer the axis where things make a smaller circle and move more slowly. However, the ball retains the speed it had down here, so it moves ahead and you couldn’t catch it. If you had wanted to catch it, you would have had to throw it up and back so that it would loop and return to you like a boomerang. The details of motion are different here on Five than on Earth.”

Modine said, thoughtfully, “You get used to it, I suppose.”

“Not entirely. We live in the equatorial regions of our small sphere. That’s where the motion is fastest and where we get the effect of normal gravity. If we move upwards towards the axis, or along the surface towards the poles, the gravitational effect decreases rapidly. We frequently have to go up or polewards and, whenever we do, the Coriolis effect must be taken into account. We have small monorails that must move spirally towards either pole; one track polewards, another returning. In the trip we feel ourselves perpetually canted to one side. It takes a long time to get used to it and some people never learn the trick of it. No one likes to live here for that reason.”

“Can you do something about that twisting effect?”

“If we could make our rotation slower, we would lessen the Coriolis, but we would also lessen the feel of gravitation and we can’t do that.”

“Damned if you do, damned if you don’t.”

“Not entirely. We could get along with less gravitation, if we exercise, but it would mean exercise every day for considerable periods. That would have to be fun. People won’t indulge in daily calisthenics that are troublesome or a bore. We used to think that flying would be the answer. When we go to the low-gravity regions near the poles, people are almost weightless. They can almost rise into the air by flapping their arms. If we attach light plastic wings to each arm, stiffened by flexible rods, and if those wings are folded and extended in just the right rhythm, people can fly like birds.”

“Will that work as exercise?”

“Oh, yes. Flying is hard work, I assure you. The arm and shoulder muscles may not have to do much to keep you aloft but they must be in continuous use to manoeuvre you properly. It keeps up the muscle tone and bone calcium, if it’s done on a regular basis.—But people won’t do it.”

“I should think they’d love to fly.”

Baranova sniffed. “They would, if it were easy enough. The trouble is that it requires skilful co-ordination of muscles to keep steady. The slightest errors result in tumbling and spinning and almost inevitable nausea. Some can learn how to fly gracefully as you saw on the holo-cassettes, but very few.”

“Birds don’t get seasick.”

“Birds fly in normal gravity fields. People on Five don’t.”

Modine frowned and grew thoughtful.

Baranova said, “I can’t promise that you’ll sleep. People don’t usually their first few nights on a space settlement. Still, please try to do so and tomorrow we’ll go to the flying areas.”

Modine could see what Baranova had meant by saying the Coriolis force was unpleasant. The small monorail coach that took them polewards seemed constantly to be sliding leftwards and his entrails seemed to be doing the same. He held on to the hand-grips, white-knuckled.

“I’m sorry,” said Baranova, sympathetically. “If we went more slowly, it wouldn’t be so bad, but we’re holding up traffic as it is.”

“Do you get used to this?” groaned Modine.

“Somewhat. Not enough.”

He was glad to stop finally, but only limitedly so. It took a while to get used to the fact that he seemed to be floating. Each time he tried to move, he tumbled, and each time he tumbled he didn’t fall but drifted slowly forwards or upwards and returned only gradually. His automatic kicking made things worse.

Baranova left him to himself for a while, then caught at him and drew him slowly back. “Some people enjoy this,” she said.

“I don’t,” gasped Modine, miserably.

“Many don’t. Please put your feet into these stirrups on the ground and don’t make any sudden movements.”

There were five of them flying in the sky. Baranova said, “Those five birds are here just about every day. There are a few hundred who are there now and then. We could accommodate at this pole and at the other, as well as along the axis, something like five thousand at a time. We could use all the space to keep Five’s thirty thousand people in condition. What do we do?”

Modine gestured and his body swayed backwards in response. “They must have learned how, those birds up there. They weren’t born birds. Can’t the others learn it, too?”

“Those up there have natural co-ordination.”

“What can I do then? I’m a fashion designer. I don’t create natural co-ordination.”

“Not having natural co-ordination doesn’t stop you,, altogether. It just means working hard, practising longer. Is there any way you could make the process more -fashionable? Could you design a flying costume; suggest a psychological campaign to get the people out? If we could arrange proper programmes of exercise and physical fitness, we could slow Five’s rotation, weaken the Coriolis effect, make this place a home.”

“You may be asking for a miracle.—Could you have them come closer?”

Baranova waved and one of the birds saw her, and swooped towards them in a long graceful curve. It was a young woman. She hovered ten feet away, smiling, her wings flicking slightly at the tips.

“Hi,” she called out. “What’s up?”

“Nothing,” said Baranova. “My friend wants to watch you handle the wings. Show him how they work.”

The young woman smiled and, twisting first one wing, then the other, performed a slow somersault. She straightened to a halt with both wings given a backhanded twist, then rose slowly, her feet dangling and her wings moving slowly. The wing motion grew more rapid and she was off in wild acceleration.

Modine said, after a while, “Rather like ballet dancing, but the wings are ugly.”

“Are they? Are they?”

“Certainly,” said Modine. “They look like bat wings. The associations are all wrong.”

“Tell us what to do then? Should we put a feather design on them? Would that bring out the fliers and make them try harder to learn?”

“No.” Modine thought for a while. “Maybe we can make the whole process easier.”

He took his feet out of the stirrups, gave himself a little push and floated into the air. He moved his arms and legs experimentally and rocked erratically. He tried to scramble back for the stirrups and Baranova reached up to pull him down.

Modine said, “I’ll tell you. I’ll design something and if someone here can help me construct it according to the design, I’ll try to fly. I’ve never done any such thing; you’ve just seen me try to wriggle in the air and I can’t even do that. Well, if I use my design and I can fly, then anyone can.”

“I should think so, Mr Modine,” said Baranova, in a tone that seemed suspended between scepticism and hope.

By the end of the week, Modine was beginning to feel that Space Settlement Five was home. As long as he stayed at ground level in the equatorial regions, where the gravitational effect was normal, there was no Coriolis effect to bother him and he felt his surroundings to be very Earth-like.

“The first time out’, he said, “I don’t want to be watched by the population generally because it may be harder than I think and I don’t want to get this thing off to a bad start.—But I would like to be watched by some of the officials of the Settlement, just in case I make it.”

Baranova said, “I should think we would try in private first. A failure the first time, whatever the excuse—” ’But a success would be so impressive.” ’What are the chances of success? Be reasonable.” ’The chances are good, Ms Baranova. Believe me. What you have been doing here is all wrong. You’re flying in air like birds—and it’s so hard. You said it yourself. Birds on Earth operate under gravity. The birds up here operate without gravity—so everything has to be designed differently.”

The temperature, as always, was perfectly adjusted. So was the humidity. So was the wind speed. The atmosphere was so perfect it was as though it weren’t there.—And yet Modine was perspiring with a bad case of stage fright. He was also gasping. The air was thinner in these gravity-free regions than at the equator—not by much, but enough thinner for him to have trouble gathering enough with his heart pounding so.

The air was empty of the human birds; the audience was a handful—the Co-ordinator, the Secretary of Health, the Commissioner of Safety and so on. There were a dozen men and women present. Only Baranova was familiar.

He had been outfitted with a small mike and he tried to keep his voice from shaking.

He said, “We are flying without gravity and neither birds nor bats are a good model for us. They fly with gravity.—It’s different in the sea. There’s little effective gravity in water, since buoyancy lifts you. When we fly through no-gravity water, we call it swimming. In Space Station Five, where there’s no gravity in this region, the air is for swimming, not for flying. We must imitate the dolphin and not the eagle.”

He sprang into the air as he spoke, wearing a graceful one-piece suit that neither clung skintight nor bellied. He began to tumble at once, but stretching one arm was sufficient to activate a small gas cartridge. A smoothly curved fin emerged along his spinal column, while a shallow keel marked the line of his abdomen.

The tumbling ceased. “Without gravity,” he said, “this is enough to stabilize your flight. You can still tip and turn, but always under control. I may not do it well at first, but it won’t take much practice.”

He stretched his other arm and each foot was suddenly outlined by a flipper—each elbow by another.

These’, he said, “offer the propulsive force. You needn’t flap the arms. Gentle motions will suffice for everything, but you have to bend your body and arch your neck in order to make turns and veers. You have to twist and alter the angle of your arms and legs. The whole body is engaged, but smoothly and nonviolently.—Which is all the better, for every muscle in your body is involved and you can keep it up for hours without tiring.”

He could feel himself moving more surely and gracefully—and faster. Up, up, he was suddenly going, with the air rushing past him until he was almost in a panic for fear he would not be able to slow up. But he turned his heels and elbows almost instinctively and felt himself curve and slow.

Dimly, through the pounding of his heart, he could hear the applause.

Baranova said, admiringly, “How did you see this when our technicians couldn’t?”

“The technicians started with the inevitable assumption of wings, thanks to birds and airplanes, and designed the most efficient ones possible. That’s a technician’s job. The job of a fashion designer is to see things as an artistic whole. I could see that the wings didn’t fit the conditions of the space settlement. Just my job.”

Baranova said, “We’ll make these dolphins suits and get the population out into the air. I’m sure we can now. And then we can lay our plans to begin to slow Five’s rotation.”

“Or stop it altogether,” said Modine. “I suspect that everyone will want to swim all the time instead of walking.” He laughed. “They may not ever want to walk again. I may not.”

For the Birds They made out the large cheque they had promised and Modine, smiling at the figure, said, “Wings are for the birds.”