Spaceship to Saturn

By Hugh Walters

A Chris Godfrey of U.N.E.X.A. Adventure

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By the Same Author

DESTINATION MARS

EXPEDITION VENUS

FiRST ON THE MOON

MISSION TO MERCURY

OUTPOST ON THE MOON

TERROR BY SATELLITE

JOURNEY TO JUPITER

SPACESHIP TO SATURN

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"Gosh, it's cold!" Tony complained as he walked with his friends through Hyde Park.

It was just two weeks after Christmas, and a sharp frost had followed several days of snow. Now the trees and grass were coated with white, and a trail of footprints was left behind as the quartet trudged ahead. In the distance, car lights were beginning to come on, and they could hear the low rumble of the London traffic.

There were few people in the park besides the four young men, for it was not a day when one walked for pleasure. The cold air made the skin on their faces feel tight, and clouds of vapor came from their nostrils as they made a beeline for Marble Arch.

"This is nothing," Serge Smyslov, the Russian member of the group, said with a grin. "This is like a warm summer day in parts of my country."

"Then I'm glad I don't have to live there," Tony responded quickly. "Why we couldn't have hopped into a taxi is more than I can understand."

"The exercise is good for us," Morrey Kant, the tall American, told him jauntily. "But you don't call this cold, do you? Not after our mission-to-Mercury experience."

The young men, rapidly striding through the lonely park, were the famous team of astronauts who had blazed a trail to several of the planets in our solar system.

They had journeyed to Jupiter, visited Venus, and had been on a mission to Mercury. To hear them talking in such a casual way, no one could have guessed that as a crew they had faced death and disaster more times than any astronaut alive. From

the lighthearted banter that was passing between them, no one —least of all themselves—could have foretold that they were on the way to keep an appointment that would lead them to adventures as fantastic and dangerous as any they had yet had.

"Step on it if you want to keep warm," the leader of the little band, Chris Godfrey, advised. "We still have at least another mile ahead of us."

They left the park, waited for the traffic lights to change, and then crossed over into Oxford Street. Shop windows were ablaze with light, the sidewalks crowded, and the traffic moved bumper to bumper. A string of buses crept along, the four young men easily keeping pace with them.

"You see, we're just as quick on foot," Morrey pointed out to Tony.

"We could try the Underground," the mechanic countered. "At least we'd be warmer there."

"You're getting soft in your old age," Serge chided his young friend. "Come on, let's see if we can leave these buses behind."

Weaving their way among the other pedestrians, the astronauts progressed along London's' busiest street. Within a few minutes, helped by two sets of traffic lights, they had left the buses some distance in the rear. By the time they reached Oxford Circus, however, the vehicles had almost caught up with them. Then, by a stroke of luck, the quartet forged ahead while a policeman stolidly held up the traffic. Soon the astronauts were striding through Bloomsbury, cutting across Southampton Row and into Theobald Road.

"How's that for time?" Morrey asked, looking at his watch. They were all warmer now, because of their rapid pace, and it turned out that they had reached the Air Ministry Building a little ahead of time. Many people were streaming from the huge red—brick edifice at the end of their day's work. It was almost five thirty.

"I wonder why Sir George wanted to see us after office hours," Tony said.

“Perhaps he wants to take us out to dinner,” Morrey suggested with a grin. Chris had an idea it was something very different, but he kept his thought to himself. A uniformed guard stepped forward from a little office as they went in through the swinging doors. The well—heated corridor felt good after the blustery cold.

“Hello, Mr. Godfrey,” the guard said, recognizing the astronaut, “the chief is waiting for you. You know the way up?”

“Yes, Soames, I can find it,” Chris told him. “You go back to your tea.”

The man grinned and returned to his tiny quarters, where they could see on a desk a vacuum bottle and a huge slice of fruit cake. Morrey, Serge, and Tony strode after their leader as he made his way toward one of the elevators. He pressed a button on the wall and the doors slid open.

They left the elevator at the sixth floor, and Chris rapped firmly on the door of Sir George Benson’s office. A light came on above their heads, illuminating the word ENTER, so the four young men stepped inside.

The outer office usually occupied by two typists was empty, but through an inner door, slightly ajar, they could see the smiling face of their friend.

“Come in,” called Sir George, and he rose from his desk to greet them.

The famous scientist, who for some years had been the Director of the United Nations Exploration Agency—UNEXA—had been responsible for organizing all their previous adventures into space. He had known the crew’s leader since Chris Godfrey’s school days, and a warm personal friendship had grown up between them. Often the young man referred to his older friend as Uncle George. Serge, Tony, and Morrey, too, were special favorites of the director, and soon there was much shaking of hands as Benson welcomed his young friends.

“’Any of you smoke yet?” the scientist asked, pushing a silver box of cigarettes across his desk.

None of the astronauts did, for they would allow nothing to interfere with their perfect health. They knew from actual experience that their very lives had often depended on being able to summon one last bit of strength.

"Didn't think you would," Benson said approvingly as he snapped the lid closed and put the cigarette box back into a drawer.

Sir George was a tall man with white hair, although his hair had been quite black not so many years before. The strain and anxieties of the many missions for which he had been responsible had taken their toll of this brilliant scientist, but he could still joke and tease his young companions.

"Well, what have you all been up to today?" the director asked as they all settled into chairs.

"Oh, just exploring," explained Morrey. "There are some really queer things in some of the museums down Kensington way."

"Did you see the rocket room? It has all the models, from an ancient Chinese firecracker right up to scale models of modern ships," Sir George said. "Did you see the V2? That's an actual rocket, of course. I can remember when they were being used to attack London at the end of the last World War. At the time it was a fearsome weapon, but later turned out to be a real breakthrough in rocket engineering."

"Yes, we saw it," Morrey told the scientist. "It looked very crude compared with the ships we've been in."

"Naturally," Benson agreed, "but without the old V2 we shouldn't be where we are today, and you young men wouldn't be able to go careering about the solar system. Have you had a good day, Tony?'

"Oh, yes," the mechanic replied. "Some of the old rockets were very crude, weren't they? Still, I enjoyed seeing them. My only grumble is that Chris made us walk all the way here. Freezing cold, it was too."

"And he's been moaning all the way," Morrey told the

director. “Anyone would think he’d never been cold before.”

“No point in freezing to death if you can help it,” Tony countered.

The young men were so engrossed in this friendly argument that none of them noticed the strange look that had flitted across Sir George Benson’s face as they were speaking. He allowed the conversation to continue for a few moments before he joined in.

“So you don’t believe in allowing yourself to be frozen, if you can help it,” he said to Tony. “That’s unfortunate.”

The discussion stopped abruptly. Chris, always sensitive to his friends moods, felt that Sir George was leading up to the reason for this call. Morrey and Serge, too, detected a peculiar inflection in the scientist’s last words. Tony, seeing the change in his companions, wondered what was coming.

“Yes. If our young friend dislikes the cold so much, there’s not much use in discussing why you’re here,” Benson went on, the twinkle back in his eyes.

“Oh, I don’t mind too much,” Tony declared hastily. “If it’s in a good cause.”

“That’s all right then,” Sir George said smiling. “I’d hate to have called this meeting for nothing.”

“Come on, let’s have it, Uncle George,” Chris chided. “Don’t keep playing with us.”

“Very well,” the scientist agreed. “I’ll tell you just why you were summoned here.”

He stood up and looked through a window at the myriad lights of London. For a few moments he paused, lost in thought. Then, quickly, he turned to the four young men who had been waiting impatiently for him to speak.

“What would you say is the greatest obstacle to the exploration of other solar systems?” he asked them.

The quartet looked at one another. It was Chris who

answered for them all.

"The distance, of course," he said.

"Precisely," Benson agreed crisply. "The tremendous distance to even the nearest star."

"Four and a quarter light years," Tony volunteered proudly, and the scientist nodded his appreciation.

"So even if we could travel at the same speed as a ray of light a crew would be bottled up in their cabin for four and a quarter years. How would that appeal to you?" he asked.

The four young men were unanimous. "Impossible" was their verdict—and they spoke from their own experiences, for they remembered their weeks on that tremendous journey to Jupiter. They were the most experienced astronauts in the world, but even they could never face close confinement for such a long period.

"If we are ever to explore other solar systems, if we want to make a serious search for other intelligent life, then either we must travel much faster than light or we must acclimate our crews to a very long journey," Benson told them. "The record length of time volunteers have spent in a simulated spaceship cabin has been five months. And it nearly finished them."

"I should think so," murmured Serge, shuddering a little at the thought of what those volunteers must have suffered.

"We haven't found a way yet to travel faster than light," the director went on, "but we have found a way of preparing crews for very long journeys."

Chris and the others were hanging on to every word the famous scientist said. Obviously they must be involved in what he was telling them. Sir George would not have asked them to come to his office just on a social call. Was there some fantastic new venture ahead?

"Ever heard of hypothermia?" Sir George asked the question almost casually.

The quartet exchanged startled glances, and again it was

Chris who spoke.

"Lowering the body temperature for some surgical operations, isn't it?" he replied.

"That's how it started," Benson agreed, "but it's now gone much further than that. It has been known for many years that a reduction in the temperature of the body slows down the chemical activity of the body cells, thus causing them to consume less oxygen. This allows the oxygen supply to brain cells to be interrupted for a considerable period. Normally cells begin to die if they are without oxygen for more than three minutes. But hypothermia permits operations that wouldn't otherwise be possible. It's the same with the heart and other parts' of the body. Cooling reduces the need for oxygen and so slows down the tempo of life!

"Meningitis was once almost a hundred—percent fatal disease," the director continued. "It's an infection of the membranes and fluid surrounding the brain, and the swelling it causes reduces the flow of blood and therefore the supply of vital oxygen. The treatment now is to reduce the patient's body temperature so that the oxygen requirements of the brain are very much lessened. This is continued until the meningital swelling is reduced, after which the body is returned to its normal temperature and the full oxygen supply restored. Without this cooling process the patient's brain cells could not have survived."

"But what's that to do with astronautics?" asked Tony.

"Just that the technique has been perfected whereby a human being can be frozen almost indefinitely and then thawed out again. On deep-space journeys this could mean a tremendous saving of oxygen and food. Equally important is the apparent saving of time," Sir George explained.

"Apparent?" queried Serge.

"Yes. The voyage itself, of course, isn't shortened. But for the astronauts, in a condition of hypothermia, time doesn't exist. Volunteers have been kept frozen for several days, and it is hard to convince them afterward that this much time has passed."

“Do they—is it painful?” Tony asked uncertainly.

“Not at all,” Benson answered. “The volunteers experienced no discomfort or adverse aftereffects. One volunteer has been through it three times, and he says he’s ready to do it as often as we wish.”

“What’s the longest period of hypothermia?” Chris enquired.

“There’s a fellow who will complete a week in just an hour’s time. As far as we can see it will be possible for much longer periods—years in fact,” Sir George told them.

“Whew!” the American exclaimed. “Isn’t there any change in the subject during that time?”

“We don’t think there will be. Certainly none has been detected so far. The subject is the same when he wakes up as when he went to sleep.”

“So if a fellow is frozen for years, he’ll be the same age when he wakes up as when he was put to sleep?” Morrey persisted.

“Physically, yes,” replied Sir George. “In every sense of the phrase, time will have stood still.”

“That could really be something,” Morrey said with a grin.

“Now, any more questions?” Benson asked.

“Just one,” Chris said seriously. “Why are you telling us this?”

At once Sir George Benson’s face became grave.

“Because I want you four to make a long journey in a state of hypothermia.”

2

While the four young men were still staggered by this statement, the director continued, speaking rapidly:

"I know this is a shock to you, and I want to tell you right at the outset that you are all free to decline. But before you make up your minds one way or the other, I want you to come with me to University College Hospital. There"—and he glanced at his watch—"in sixty-five minutes you can talk to the volunteer who's been frozen for a week."

Gradually the quartet recovered their poise. It would certainly be fascinating to see and talk to someone who had, seemingly, been dead for a week. They could find out at firsthand what hypothermia felt like.

"Perhaps you can give me your answer after you've seen and talked to the man you're going to see," the director suggested. "I'd like to know no later than tomorrow."

He rose, and Chris and the others followed him out of the office. They took the elevator to the basement and made their way to the underground parking lot. It was almost deserted, and Sir George's ancient vehicle was easily seen.

"When are you going to change this heap?" Morrey wanted to know as they piled inside.

"It suits me," the director replied, pressing the starting button. "It's fine for running about town."

"Perhaps UNEXA will present you with a new car when you retire," suggested Serge.

"That'll be the day," Benson answered promptly, as he drove up the ramp and out into the street.

Now that the worst of the rush-hour traffic was over it took them less than five minutes to reach the hospital. Sir George

carefully maneuvered his car between a couple of Bentleys.

"You ought to have been a consultant," Tony observed as they climbed out and followed the scientist into the building.

A porter came forward to meet them.

"You know your way, Sir George?" the man asked.

"Yes, thank you, Potter," Benson replied, and he led his little party down two flights of stairs into the brightly lighted basement.

"Ah, Benson," exclaimed a white-coated man who came forward to meet them. "You're just in time."

"Hello, Morrison. These are the young men I was telling you about. Fellows, this is Dr. Morrison who is in charge of the hypothermia unit. Can you brief them before we go in?"

"There isn't much time," the doctor said hurriedly. "I'll tell them all about the process as we go along."

He took them through a door into a laboratory. The quartet had no eyes for the white-coated men in the room. They focused their attention immediately on a transparent cone right in the center. It was surrounded by masses of apparatus. And inside was the body of a man.

Tony caught his breath as he saw the deathly pallor and stillness of the man in the glass box. Surely this man was already dead? They weren't proposing to bring him back to life, were they? The mechanic felt his knees begin to shake as they all walked nearer to that still form. Even Chris felt a little queer as they stopped alongside the transparent case.

"Well, now then," Dr. Morrison began, drawing on some rubber gloves, "this is one of our young doctors who volunteered his help. He was put into a state of suspended animation just a hundred and sixty-seven and a half hours ago. The process is a fairly simple one, and the same principle has been used in surgery for many years. Indeed, there are tens of thousands of people alive and well today who owe their lives to hypothermia.

"The patient is first given an injection," the doctor went on.

“This is to prevent his body fluids from freezing, for we reduce his temperature to just under freezing point—minus one half degree centigrade, in fact. Without this injection he would become a solid block of ice and would die. The apparatus you see reduces the body temperature from blood heat to freezing point in twenty minutes. It can then maintain the set temperature accurately for an indefinite period.”

“I guess that injection acts like antifreeze in an automobile,” Morrey said solemnly.

“Rather more than that,” Dr Morrison answered, “but that is the general idea. Now the other important feature is that, because all muscular action has ceased, we introduce minute quantities of oxygen directly into the bloodstream. Without this the brain cells would die. I want to show you something that has made the whole thing possible—the little piece of apparatus that has revolutionized the whole concept of hypothermia.”

Dr. Morrison went to a bench, opened a drawer, and carried back to them a small cylinder just over two inches long and three eighths of an inch in diameter. The astronauts examined it curiously.

“Though it isn’t much to look at, this is a most wonderful piece of mechanism,” the doctor explained. “It is, in effect, a small pump. By a fairly simple operation it is inserted into one of the arteries, and from then on it assists the heart in maintaining the flow of blood around the body. When the muscular action of the heart ceases under hypothermia, the little pump maintains just a small amount of circulation, enough to keep the subject alive.”

“But what makes it work?” gasped Tony.

“It has a tiny battery inside,” Morrison explained, “but for long periods it can pick up energy from radio pulses. That is the pulse transmitter over on that bench. We’ve had one of the pumps working continuously for over two years.

“Has this volunteer a pump in one of his artieres?” asked Morrey, indicating the still figure inside the case.

“Yes. As I said, it’s a minor operation causing a slight

soreness which lasts about three days. After this test is over, another small incision will remove the pump, and apart from a slight scar, our volunteer will be exactly as before."

As he finished speaking, Dr. Morrison called to several of his assistants. They manipulated the apparatus around the transparent case, while the doctor explained that they had already begun the process of returning the subject's body temperature to normal. A series of dials, including an electrocardiograph, would show when the subject was beginning to thaw out long before there was any visible sign.

Sir George Benson and his young friends crowded around the case, intently watching the still figure. It was so hard to believe that the young man wasn't dead—he was so still, pale, and lifeless.

"He's started, called Dr. Morrison a few minutes later.

The watchers turned and saw that the pen which was tracing a line on the moving paper of one of the instruments had made a little jump.

"That's the first sign of a heartbeat," explained the doctor. Even as they looked at the paper roll the pen gave another quiver and traced a V in the continuous line.

"We're still using the Flavell pump"—indicating the tiny piece of apparatus he'd shown them—"to keep him alive. Soon the heart will take over for itself, and we shall cut the pump out," Morrison told them.

"Muscular action starting," one of the assistants called out. Another instrument was monitoring the minute electrical impulses that travel along nerves to animate the muscles. It had shown that the pulses were beginning to flicker along their appointed paths, and soon the patient would start breathing.

"Does he require artificial respiration?" Chris asked.

"No. He'll start up naturally," Morrison answered. "His temperature is now only five degrees below normal. Watch him closely from now on."

Obediently, Chris and his friends turned away from the

instruments to stare at the man in the transparent case. He didn't look so pale now, and Tony fancied he saw an eyelid flicker. The heart was beating more strongly now, and Dr. Morrison gave the order to stop the radio pulses operating the Flavell pump in the patient's arm.

"Look, he's moving!" Tony called out suddenly.

The volunteer's chest was definitely rising and falling as his muscles took over the task of respiration, and the eyelids were flickering more frequently.

"Remove the case," Dr. Morrison ordered.

Four assistants lifted off the transparent covering, for the volunteer's temperature was now normal. He was still connected to the monitoring instruments by a mass of wires. Quite suddenly he opened his eyes and for a moment gazed blankly. Then he focused on his audience. His mouth moved, and he spoke.

"Is it over?" he asked in a weak voice.

Dr. Morrison came forward and bent over the recumbent young man.

"Yes, Sanders, it's all over. Keep still while we detach the wires," he said.

Swiftly the assistants removed the bonds and wires that were round the young man's body.

"Right. You can sit up now," Morrison told him.

The volunteer struggled up into a sitting position and swung his legs over the side of the table. One of the assistants passed him a flask of yellow liquid, which he drank.

"I'd better introduce you," Morrison declared breezily.

"Gentlemen, this is Dr. Sanders, one of our young resident surgeons. Sanders, you've already met Sir George Benson. These other young men are the four astronauts who are very much involved in our experiments."

The young doctor smiled and shook hands with his audience.

"It isn't too bad, you see," he told them as he slipped on a

dressing gown that had been brought to him.

"Will it be all right to have a nice long chat?" Sir George asked Dr. Morrison.

"Perfectly," the doctor answered. "Just let Sanders get dressed, and then we'll all go to my office for coffee."

Ten minutes later Dr. Sanders joined his chief, Sir George, and the famous quartet in Dr. Morrison's office. There was scarcely room for all of them because of the mass of filing cabinets. So Tony found it easier to hoist himself up to sit on top of one of the cabinets. For a moment Morrison looked as if he would say something about this disrespectful attitude toward his beloved records. But he said nothing. The coffee was passed around.

"Now then, I expect you'll want to ask Sanders all about it," the doctor said.

Tony jumped in first with the most obvious question.

"Does it hurt?" he asked.

Dr. Sanders assured them that there was no sensation. This had been the fourth and longest period he'd been through.

"Better describe whatever it is you feel," Morrison suggested.

The young doctor hesitated for a moment.

"There's so little to tell you," he began. "Perhaps the most remarkable thing about it is that it doesn't seem to happen. One moment you are waiting for the experiment to begin and the next it's all over."

"Don't you feel cold?" Morrey asked.

"There is a slight feeling of chill at first," Sanders told them, "but it's hardly noticeable. As I say, the time you are frozen doesn't seem to exist. At first I refused to believe that I'd been out for four hours. Nor the next time when I was frozen for twelve hours."

"How did it feel this time?" Chris asked. "You were under hypothermia for a much longer period."

"But it was just the same," the surgeon assured him. "It

seemed that the process was starting, and a few seconds later you were crowding around to watch me thaw out."

"So for you the last week hasn't existed," Sir George Benson suggested.

"You could put it that way, sir," Sanders agreed. "It's only because I've been told that I know I've been in that case for seven days. I still find it hard to believe."

"It's amazing," exclaimed Serge. "A week has been lost out of your life."

"That isn't so uncommon," Morrey pointed out. "Many people have been unconscious for weeks—months even after an accident."

"But there is a vital difference," Dr. Morrison insisted. "Under hypothermia the life process is in almost complete suspension. When a patient is unconscious, the life process continues. He has to be fed intravenously, and his hair grows. There was a famous case of a man injured in a car accident. He was unconscious for almost ten years, and during this time his hair turned gray. When he recovered from his coma, he was certainly ten years older."

"Are you saying that there is no aging process during hypothermia?" asked Chris.

"Physically, very little," the doctor informed his listeners. "Sanders, here, is only one day older than he was eight days ago."

"But—er—will his birthday be altered?" asked the puzzled Tony.

The rest of the little gathering burst into roars of laughter at the mechanic's strange question. Tony couldn't see anything to laugh about.

"I don't think so," Dr. Morrison replied. "I don't think Sanders would want his birthday changed, would you, Sanders?"

"No I wouldn't," the young surgeon replied, laughing. "As it is, my relatives are always forgetting. They'd never remember if

I changed the date. Besides, I have a twin brother. Any alteration of my birthday and not his would be very awkward."

"You know, some very interesting situations are possible if hypothermia can be prolonged for a number of years," Sir George Benson observed. "A man, after a prolonged spell in suspended animation, would awaken to find his wife older than he was."

"He might even have a son older than himself," Morrey suggested.

"How's that?" Tony asked.

"Well, suppose a young man of twenty—five with a baby son were put into cold storage for, say, thirty years. When he thawed out, he'd still be twenty-five and his son thirty," the American explained, trying hard to be serious.

"That's right." Tony agreed, very impressed, "and a man of twenty-one, if he were put to sleep for forty-four years, would have his old-age pension when he woke up."

"But think how dreadful it would be to return to life after a long period of hypothermia to find that all your relatives and friends were dead," Chris pointed out.

"Yet how exciting it could be to wake up and see all the wonderful technical developments that had taken place while you were asleep," Serge pointed out.

"If you've finished speculating, can we return to the present?" Sir George asked patiently. "You came here to speak to Dr. Sanders about any rough spots. Remember there is a decision you will soon have to make."

3

This timely reminder silenced Chris and his friends for a moment. As Sir George said, they were here to help them decide whether they would undergo hypothermia on their next voyage into space. It was all very well for Dr. Sanders to be frozen for a week, but from past experience and with intimate knowledge of modern rocket performance, they knew that this next voyage would take many months. Could anyone be sure that hypothermia would work over such a long period? Or that they could be revived after the necessary lapse of time?

Tony jumped down from the top of the filing cabinet as a shocking thought hit him.

"Hey!" he exclaimed. "It's all very well to talk about freezing people to go on a long space voyage, but who's going to thaw them out at the other end?"

"That's quite a problem," admitted Sir George with mock seriousness. "If you four go, someone will have to stay awake to defrost the others."

"Not me," spluttered Tony, "I wouldn't spend months alone with no one to talk to."

"All right, calm down," the director said, grinning. "I was teasing, Tony. Actually the freezing and thawing process will be done automatically by apparatus which has just been perfected. Either process can be initiated by a radio signal from Control or by a little black box which has been previously programmed. The black box will be part of the spaceship's equipment to make doubly sure that nothing goes wrong."

"Has it been tested yet?" Morrey asked.

"Not on humans," Dr. Morrison interposed, "but it's functioned perfectly on scores of trials with animals."

"I was hoping that you would all agree to try out the antifreeze before making a final decision," Benson admitted.

"About that pump in your arm," Serge said to Dr. Sanders. "Does it give you any discomfort?"

"None," the surgeon replied. "My arm was sore for a few days after it was inserted, but that soon disappeared, and now I don't feel a thing. It can be left where it is as far as I am concerned."

"No, we will remove it shortly," Dr. Morrison informed his young colleague. "However, the Flavell pump, when it is fully developed, will have a tremendous number of medical applications, and no doubt will remain inside patients permanently."

"Tell us, Dr. Sanders," Morrey said, "are there any snags in the hypothermia?"

"No," the young doctor answered. "At least I haven't found any. I find I'm terribly hungry when I wake up. Otherwise—nothing."

"We're hungry all the time," Morrey commented, "especially Tony."

"If you've no more questions, perhaps you won't mind if Sanders goes to the canteen for a hefty meal," Dr. Morrison said.

"Of course not," Chris answered quickly. "Sorry we've been keeping you from your chow, Dr. Sanders."

"Think nothing of it," the surgeon replied with a smile. "They certainly lay on a special feed for me on these occasions, so it's worth waiting for."

Sir George Benson and his four young companions thanked the doctors for answering all their questions, and then they left the room.

"What do you think?" Benson asked as they drove away from the hospital.

"That fellow Sanders looked like a goner when we first saw

him," Tony declared. "It was spooky how he came alive after he'd been warmed up."

The others laughed, but they all agreed that it was amazing to see the young doctor so little affected by his unusual ordeal.

"He said there was nothing to it," Morrey pointed out. "Wasn't it four times he's had hypothermia? He must be getting to like it."

"Perhaps he wants to prolong his life," Chris interjected.

"Hey! that's an idea," Tony burst out. "I'll go into the ice box if you'll attach a label that says "Please defrost in 10,000 A.D."

"I don't think you'd like that," Sir George said. "A short period might be all right, but thousands of years is quite another matter. You would be as unhappy and bewildered as a prehistoric man suddenly thrust into Piccadilly Circus. Frankly, that side of hypothermia hasn't been worked out yet."

"I'd certainly like to try it for a short period, of course," Morrey told the others. "If Dr. Sanders can do it, surely we could; After all, we're supposed to be pretty tough physically.

"You certainly ought to be," Sir George agreed, remembering all the strenuous adventures the astronauts had experienced in the past.

"Would you like us all to have a short trial run before we finally decide on the space venture?" Chris asked.

"I'd prefer it. Actually there are two things you have to be convinced about," Sir George said. "The first is the hypothermia process itself. The second is the reliability of the automatic equipment to be used. So if you wish to give it a trial, we'd have to split you into pairs."

"Why?" Morrey inquired.

"While two of you undergo the cooling process, the other pair would be observers. Then we'd change over, and the first two could watch the others testing out the automatic apparatus," the director told them.

"Couldn't we all go into this together?" Tony asked.

“You can certainly have a trial run together afterwards,” Sir George assured him. “In fact you would have to do this in order to test the equipment in your ship.”

“A trial run?”

“Exactly, except that it will be much shorter than the real thing,” Benson answered.

“I don’t know how these characters feel,” Chris said, but I’m game to try it.”

“Same here,” Morrey said, grinning.

“Me, too,” chorused Serge and Tony.

“That’s fine. Nothing like finding out for yourselves,” the director concluded. “It will take a day or two to get ready, so keep out of trouble for the next few days.”

Sir George left the astronauts at their flat, but refused the invitation to have some coffee with them.

“No. I’d rather you talked this thing over among yourselves and then let me know what questions you have. Phone me at noon tomorrow, and I’ll probably be able to tell you when you can test out the hypothermia.”

The four friends talked about what they had seen until long past midnight. They all agreed that if the process proved to be reliable, it would open up new possibilities for space travel. Until some means could be found of traveling faster than light, deep-space voyages were limited by the psychological stamina of the crews. If hypothermia could “eliminate” time, then journeys beyond the solar system—perhaps to the planets of other systems—became feasible.

The quartet worked themselves up into quite a state of excitement as they speculated on the strange situations that could arise if a person were frozen indefinitely. At last Chris had to put an end to the fantastic conjectures and tell them it was time to turn in.

“Otherwise we won’t wake up in time to phone Uncle George,” Chris argued, so the others reluctantly agreed to retire.

“Sir George Benson? Hello, Uncle George. This is Chris. We’re still willing to go ahead with the hypothermia. Have you any news for us?”

“So you haven’t had second thoughts?” the voice of the scientist asked. “Very well. Then please meet me at University College Hospital at nine o’clock in the morning.”

“We’ll be there,” Chris assured him.

“Oh—er there is one thing,” Sir George said hesitantly. Chris wondered what was coming.

“I hate to tell you,” Benson went on. “You can’t have breakfast tomorrow morning.”

“I like that!” Tony declared indignantly when Chris had reported his conversation. “What’s the idea of making us starve?”

“You haven’t forgotten, have you, that we must all undergo a small operation?” Morrey reminded him. “Remember the Flavell Pump?”

“Gosh! I had forgotten,” Tony admitted. “Will it be much of an operation?”

“I don’t think so,” Chris told him. “But from Uncle George’s veto of our morning meal, no doubt we will have a general anesthetic.”

“Doctor Sanders said it wasn’t too bad, didn’t he?” the mechanic asked anxiously.

“He said there was nothing to it,” Serge assured him. “just a little nick in the arm and the arteries tied to the small pump.”

“Sanders said his arm was sore for a few days, but otherwise there was no discomfort,” Chris reminded him.

“Oh well,” Tony said with resignation, “if we can’t eat tomorrow morning, there’s nothing to stop us from having a good lunch now, is there?”

Promptly at nine o’clock the next morning the four friends arrived at the hospital. Sir George was waiting for them just inside the entrance.

“I beat you to it,” he declared as he greeted his crew quietly. “I’ve been here an hour making arrangements with Morrison. Hope you remembered not to have breakfast.”

They said they had followed his instructions not to eat anything, and Tony’s plaintive query as to whether they would be able to have lunch was interrupted by the arrival of Dr. Morrison himself.

“Ah, so our young friends have arrived,” he exclaimed enthusiastically. “No breakfast?”

Chris, Morrey, and Serge repeated their assurance, but Tony didn’t answer. The doctor stopped as he was about to lead them down a corridor. He turned to the mechanic. “You haven’t eaten, have you?”

The other three astronauts burst into laughter. “Of course he hasn’t. Can’t you tell from his face?”

“Good,” Morrison said briskly. “Follow me to one of the wards. It will soon be over. There’s nothing to it.”

“That’s what the dentist always says,” Tony muttered as he followed the little group.

At the entrance to the ward a nurse met them.

“These are the four young men I told you about,” Dr. Morrison said. “Are the beds ready?”

“Yes, sir. The screens are up too,” the nurse replied.

“Then off you go,” Morrison told the quartet. “Undress, put on the hospital gowns and socks, and get into bed. The nurse will prep you.”

“Why do we have to get in bed?” Tony complained, as Sir George and Dr. Morrison left them in the care of the nurse.

“Come on. Stop grumbling,” Morrey chided his young friend as they walked down the Ward.

Their progress was watched with curiosity by various patients. Some of them had their legs hoisted high up.

“Motorcycle accidents,” the knowledgeable Morrey whispered.

Four beds at the far end of the ward were discreetly curtained.

"I'll be back in a few minutes," the nurse told them.

"Want help with your buttons?" Chris asked Tony innocently. With a scowl the mechanic disappeared behind his curtains.

Almost before they were in bed the nurse was back, and a doctor was with her.

"This is Dr. Garratt, the anesthetist," the nurse told them. Half an hour later, after chest examinations, blood tests, and injections, the quartet were ready for the operating room.

The curtains had now been drawn so that the four friends could see one another, although they were screened from the rest of the ward.

"I feel fine," declared Tony. "I'm not a bit scared."

"That's the effect of your atropine injection," Serge told him. "I wonder who'll go first?"

They all went together. A number of white-coated orderlies came in with wheeled stretchers onto which the astronauts were lifted. Then, to the amusement of the rest of the ward, they were pushed in procession right up the room and out into the corridor.

"I do feel like a sissy," Tony said uncomfortably.

"And not even a nurse to hold our hands," grumbled Morrey.

One at a time an elevator took them down to the basement where they were met by a number of masked and gowned figures. One of them came forward and spoke with the voice of Dr. Morrison.

"Any volunteers for number one?" it asked cheerfully.

"Would you like to go, Tony?" Chris inquired.

"Oh—er—no. I'll wait for you," the mechanic answered hastily. "I don't mind being last if you fellows want to get it over."

The astronauts couldn't decide who was to go into the operating theater first, so Dr. Morrison settled the issue by selecting Serge. Two nurses wheeled the Russian away almost before he could wave to his companions. One by one, over the next hour, Chris, Tony, and Morrey followed. As each went into the room where they were to be anesthetized, they had a quick medical check and then a mask was put over their faces.

"Breath in deeply," a voice said, and the next thing each of them knew was that he was back in the ward bed. Serge was awake first, and a few minutes after coming around, he tried to raise himself up on his left elbow to have a look at the others. A sharp pain in his arm reminded him of the operation, so he switched to the other side.

Chris, Morrey, and Tony were still unconscious, but within half an hour of each other they awoke. The nurse came in and found them chatting away.

"Good," she said, on seeing them. "I'll send you in something to eat."

This cheered the astronauts who felt fit except for sore left arms and a general dryness in the mouth.

"Wonder what the nurse will send us." Morrey mused, while Serge speculated on how long they would remain in bed.

"Hey!" Tony burst out suddenly, "do you fellows realize that Sir George has never said where we are going?"

4

"Well, that wasn't too bad, was it?" Sir George asked cheerfully.

He had come the next morning to collect his young friends from the hospital. Even the soreness in their arms was easing, so they had to agree with the scientist.

"When do we get frozen?" Chris said, voicing the question they all wanted to ask.

"In three days, when your arms are no longer sore, we'll start. I suggest that Chris and Tony try it out first, while Morrey and Serge look on. We'll put you out for twelve hours. Next day you can change over. Does that suit you?"

Now that they had gone so far, the four young men were eager to get on with the job.

"What shall we do in the meantime?" Chris asked.

"Oh, have a good time, but don't get into trouble. Why not run out to see the Patrick girls?" Sir George suggested.

"Good idea," the quartet agreed unanimously. "We haven't heard anything from them for a few weeks."

Gill and Gail Patrick, twin sisters, had become close friends of the astronauts. Apart from being gay and attractive companions, the two girls had an extraordinary gift. They possessed the power of telepathy to an uncanny degree. It was this amazing ability that had led to their selection for a communications experiment. Gill had accompanied the astronauts on their last voyage to the planet Mercury, and her gift had functioned over the vast distances of the solar system. Unlike radio communication, telepathy had proved to be almost instantaneous, and Gill's constant contact with her sister back on Earth had saved the spaceship's crew from disaster.

When the four arrived at the Patrick bungalow in Chislehurst, only Gail and her mother were at home. The astronauts were greeted enthusiastically, and Mrs. Patrick insisted that the young men stay for lunch.

"I've told Gill. She's at library changing some books," Gail announced cheerfully. "She'll be home in half an hour."

The ability of the sisters to "speak" to each other, no matter how far apart, never failed to astonish Chris and his friends. They remembered how incredulous they had been on first meeting the girls, but they had soon been convinced of this amazing power. The memory of how much they owed to the twins was still fresh in their minds.

"Ask Gill to bring an extra two pounds of steak," Mrs Patrick said to Gail, and the girl instantly flashed the request to her sister.

"Well, what have you been doing with yourselves?" Chris asked Gail as they settled in the comfortable living room. Mrs. Patrick had disappeared into the kitchen to make the necessary preparations for lunch.

"Oh, we've both been to Lunar City," Gail answered excitedly. "It's growing bigger and more wonderful all the time."

She was referring to the amazing base that had been constructed on the Moon, which now housed more than a thousand people. In glowing terms she described the latest developments and how the city was now able to supply its own water and oxygen.

"I still don't like the local food," she declared, and her listeners knew she was talking about the algae that were grown in vast tanks. These tiny plants helped to augment the provisions ferried from Earth and to maintain the oxygen content of the base. They were still talking about the colony on Earth's satellite and the people Gail had met when Gill sailed into the house.

The girl was breathless from hurrying, but bright-eyed with the pleasure of seeing her friends again. The six young people

were babbling away together when Mrs. Patrick announced that lunch was ready. When they had eaten and the girls had washed the dishes, they took their coffee into the living room.

"Now it's your turn to give us the news," Gail insisted.

"We've just come out of the hospital," Morrey confided diffidently.

"What? Have you all been ill? Had an accident?" the girls and their mother asked anxiously.

"Nothing like that," Chris reassured them. "We've all had a slight operation."

"But why—if you haven't been ill?" Gail insisted.

"A tiny pump was inserted into the artery in our left arms," Serge told the girls and their mother. They looked at the astronauts in surprise.

"Whatever for?" asked Mrs. Patrick.

"It seems that we are to be frozen on our next voyage," Chris explained with a smile. "These little pumps will help to keep us alive."

"How horrible!" exclaimed the girls' mother. "What's going to happen then?"

"The idea is to put us into cold storage during the next trip. We gather it's going to be a long one, and this stunt—hypothermia, they call it—will not only save oxygen and food, it will also save us endless boredom," Chris explained.

"You see the idea is to freeze us into a deep sleep and then to wake us up just before we arrive," Morrey volunteered.

"Sounds ghastly," Gill murmured. "Will it work? Is it risky?"

"That's what we have to find out," Serge told her. "Sir George took us to see a man thawed out after being frozen for a week. He seemed none the worse for it."

"We're going to give it a trial in a couple of days or so," Tony said, determined not to be left out of the conversation.

Chris gave a rapid sketch of how hypothermia worked and

why it was necessary to have the small pump inserted into the arteries.

"It still seems dreadful to me," Mrs. Patrick protested. "It doesn't seem human."

Chris and his companions hastened to reassure their hostess.

"It'll be much better than the boredom of a very long journey," Chris explained, "and it will be necessary if man is to venture any farther out into the universe."

Tony entertained Mrs. Patrick and the girls with accounts of the fantastic situations that might arise because the aging process stopped under hypothermia.

"If one of you had it for any length of time," he said to the girls, "you wouldn't be twins anymore."

"How could that be?" Gill and Gail asked together.

"What Tony actually means," Serge explained, "is that if one of you was put into a state of suspended animation for a lengthy period, that one would age far less than the other."

"No, thank you," the girls declared firmly. "For us it's either both or none."

"You're not likely to experience this—hypothermia, is it?—so you needn't think about it," Mrs. Patrick said nervously.

"Don't worry," Chris reassured her. "I don't think anyone is likely to suggest it for them."

"Oh, but think, Chris," Gill protested, "if you four get frozen for any length of time, we'll be older than you when we see you again."

"You will always be charming, no matter how old you are," Morrey declared gallantly.

Chris carefully parked his car outside University College Hospital. He wondered what would he feel like, the next time he sat at the wheel. It was now barely nine o'clock in the morning, and it would be midnight before the experiment would be over. What would the next fifteen hours bring?

Tony, the other astronaut selected for this initial trial, betrayed his feelings by his ceaseless chatter. He talked about everything under the sun, affirming every few minutes that he wasn't in the least bit nervous. The others tolerated his torrent of words with patience and understanding.

Dr. Morrison, brisk as ever, met the quartet and without losing any time gave Chris and Tony their instructions. They were to undress and put on the simple cotton gowns like the one they had seen Dr. Sanders wearing. Then they would have their injections.

"Antifreeze, I think you called it," the doctor said with the trace of a smile.

Tony felt very self-conscious as he donned the white garb that had been put out for him. A stream of humorous comments from Morrey didn't help, but the mechanic comforted himself with the thought that it wouldn't be long before their positions were reversed.

"All set?" Dr. Morrison inquired a few minutes later. "Fine. Climb onto the two tables and let us start."

Chris and Tony complied. Besides Serge and Morrey, there were half a dozen laboratory technicians around them. The tables were similar to the one on which they had seen Dr. Sanders. There was a complicated array of gadgets around each of them, and alongside were the transparent cases that would shortly be placed over Chris and Tony.

Someone was coming forward with a tray containing two hypodermic needles. It was the young surgeon who had gone through the experiment several times.

"I thought I'd like to get some of my own back," he said brightly, when he saw that his victims had recognized him. "It's a change not to be on the receiving end."

"I had hoped you were here to give us moral support," joked Chris, "not to get your revenge."

After wiping Chris's arm with surgical alcohol, Dr. Sanders slowly filled the hypodermic syringe from a phial of clear liquid.

Then, taking a firm hold of the arm and stretching the skin tight, he plunged the needle in. A slow, steady pressure completely emptied the syringe into Chris's bloodstream. The surgeon then withdrew the needle and wiped the skin again with alcohol.

"Now you," he said cheerfully to Tony.

The mechanic suffered the same fate. Then Dr. Morrison supervised the fastening of a number of metal bars with attached wires around Chris's and Tony's arms, chest, and head. The two astronauts knew that the wires leading from the metal bars were the means of monitoring what was going on inside their bodies during the test.

"All complete," Dr. Morrison announced at last. Two laboratory assistants lifted on the transparent covers and fastened them down.

"Switch on," the doctor ordered, and a low hum filled the room. The needles on the two temperature dials inside the covers began to flicker, indicating falling temperatures. Hypothermia had commenced.

Serge and Morrey were watching their friends closely, for they knew that they themselves would be in the same position twenty-four hours later. Chris could see his friends bending over him. He gave a reassuring smile through the transparent cover. Morrey responded with the thumbs-up sign. Now Chris was feeling distinctly chilly, but it wasn't at all unpleasant.

"Look, his eyes are beginning to close," Morrey cried, watching his leader.

"Tony's are, too," Serge called from the other table.

Readings of the temperature recorders were falling steadily, and the electrocardiographs showed that the heart actions of the two subjects were slowing rapidly. So, too, was respiration. It gave the two watching astronauts quite a jolt when at last the moving line of the heart-recording machine remained steady. The hearts of their two friends were no longer beating. Neither were they breathing anymore, and it took quite an effort to believe that Chris and Tony were not dead.

In one corner of the basement laboratory two machines were enclosed in black cases about a cubic foot in size. An uninformed onlooker would wonder about their purpose, for they were soundless, showed no moving parts, and seemed completely unconnected; yet these two instruments were playing a vital part in maintaining the lives of Chris and Tony. They were the pulsators radiating at intervals the invisible pulses that worked the tiny pumps keeping the astronauts alive.

"One is sufficient," explained Dr. Morrison, noting Serge's interest in the two pieces of apparatus. "We've never had a breakdown yet, but having two makes doubly sure. Incidentally, you can't feel anything in your own arm, can you? I can assure you that your own Flavell pump has also been put to work."

"No," admitted Serge, "I can feel nothing. Can you, Morrey?"

The Americans answer was also negative. In fact, he had completely forgotten the presence of the minute piece of mechanism in his arm.

"Well, they're away now," Dr. Morrison said to, the two watching astronauts. "There won't be any change in them at all until we start to raise their temperatures. Stay as long as you like, but I suggest you go out for a few hours. We shall start reviving them at ten P.M."

The American and the Russian looked at each other uncertainly. Somehow it didn't seem right to leave their British friends. Reason told them that what Dr. Morrison had said was very sensible. Chris and Tony would be watched constantly by experts. But they looked so deathlike and still in their transparent cases that only by a great mental effort could they tell themselves that their fears were unwarranted.

"Very well," Serge said. "Morrey and I will go out for some fresh air. We'll be back early this evening."

In his heart the Russian really didn't want to go, but both he and Morrey would have hated to admit that they were worried about the safety of their friends. So, putting on a brave face, and with a last look at the two still figures, Morrey and Serge walked out of the laboratory with a carefree air that neither of them

felt.

The hours that followed were long and deadly for Morrey and Serge. They rarely missed a meal, but neither of them felt hungry today, and so lunch was not even suggested. For more than an hour they watched the birds on the Serpentine. Then they took a brisk walk all the way around Hyde Park. After that they wandered along Oxford Street, vainly trying to interest themselves in the shop displays. During all this time their thoughts were on their comrades, and neither Serge nor Morrey could quite relinquish the fear that something might go wrong.

With a start they realized that they were outside the hospital. Without doing so consciously, they must have turned their steps toward the place which was so very much in the center of their thoughts.

"It's only half past five," Morrey announced, looking at his watch. "Shall we wait a little?"

"If we go in now, it will look as though we are very anxious," Serge pointed out. "Let's wait a little longer."

It was no use. By six o'clock it was physically impossible to stay outside any longer. Their feet, it seemed, had developed a will of their own, and Serge and Morrey found themselves walking toward the basement laboratory. They stopped outside the door, hearts beating, and listened for sounds from the other side.

All was silent. The two friends looked at each other with growing concern. Surely there should be some sound from the laboratory. Unless... Swallowing hard, Morrey knocked on the door and twisted the handle firmly.

5

The lights inside the basement laboratory had been dimmed. Only one above each of those dreadful glass cases and a few along the instrument panels illuminated the room. Feeling great anxiety, the pair tiptoed toward the objects of their concern.

"Back early, aren't you?" someone said to them.

In the dim light they could see that the speaker was Dr. Sanders. They asked him how their friends were faring.

"Absolutely fine," the surgeon said softly but enthusiastically. "They haven't consumed half a liter of oxygen all day. Dr. Morrison is off duty at the moment. He won't be coming back for another two hours."

Serge and Morrey peered intently at the two motionless figures. Try as he might, Morrey couldn't detect the slightest sign of life in either Chris or Tony. How relieved he'd be when ten o'clock came and his two pals were aroused from their unnatural sleep.

To keep themselves busy during this trying period, the astronauts wandered around the laboratory. Dr. Sanders tried to arouse their interest in various pieces of apparatus, including heart-lung machines and the very latest in artificial kidneys. In spite of the young doctor's enthusiasm, Serge and Morrey could whip up little interest in the things they saw. Their thoughts were constantly returning to Tony and Chris, and the unspoken question was growing ever more urgent—would their friends be all right?

By the time Dr. Morrison returned just after eight o'clock, the two astronauts were almost at the point of collapse. They tried to conceal their anxiety, but Morrison saw it at once.

"Haven't you any confidence in us?" he barked. "Do you

think Sanders was spoofing? Would we have risked the lives of your friends unnecessarily?"

Morrey stammered apologies. He was wondering if it was essential to keep their friends in suspended animation until ten o'clock. Couldn't they be revived now?

Dr. Morrison really lost his temper, so that the two astronauts, mentally bruised and battered, retired to a far corner of the laboratory to recover their composure. They were relieved when Sir George Benson arrived. The director spoke with Morrison, and during the conversation the two spacemen saw the chief look in their direction. They felt very uneasy when he came striding toward them.

"Been getting under Dr. Morrison's skin, haven't you?" he asked. "He's very touchy, particularly when there's an experiment going on."

"Sorry, Sir George," Morrey apologized. "We are anxious about Chris and Tony. Seeing them like that, it's hard to believe they're not dead."

"I know," Benson answered. "It's a question of the conflict of reason and your emotions. Reason, in the form of Morrison, says your two friends are all right. Emotion, caused by seeing them lying so still, gives you doubts. You must be patient a little while longer, then you'll laugh at yourselves for getting so steamed up."

"I wish we could have had the test first," Serge observed. "It would have been easier than this waiting."

"But Tony and Chris would have had the suspense instead," Benson pointed out. "Tony might have been even more affected than you are."

"How much longer now?" asked Morrey.

The laboratory clock said another forty-five minutes!

"I—er—suppose he couldn't speed it up a bit?" Serge asked timidly.

"Would you like to turn back only three parts of the way to a planet?" the scientist demanded. "No. Stick it out. You'll see it

isn't so bad. In an hour or so you'll be able to laugh at these fears."

Not until fifteen minutes before their friends were due to be revived did Morrey and Serge venture back toward the two still figures. Dr. Morrison was too busy to notice them, but Dr. Sanders gave them a friendly grin. Technicians and doctors were busy around the transparent cases. A start was made on the temperature control. As they'd seen once before, Morrey and Serge noticed the needles of the dials begin to move upward. Slowly the body temperature of their friends was raised. They watched intently for the first sign of life.

Morrey was sure that things had gone too far and that Chris and Tony would never be revived. As the creeping seconds dragged by and there was still no movement from either of them, Morrey felt his mouth become dry and a lump seemed to form around his heart. Serge was looking

Very grim. It was always hard to tell what the Russian was thinking.

Chris watched the white-coated priests prepare him for the sacrifice. At least it was easy to imagine that, he told himself whimsically. He turned his head and could see Tony receiving the same attention. If he could only catch the mechanic's eye he could smile reassurance to him. But the white coats were in the way, and he couldn't see across to his friend. However, he did see both Morrey and Serge bending over his case anxiously, so he smiled back to let them know everything was all right.

He was beginning to feel distinctly chilly. And sleepy, too. It wasn't an unpleasant feeling. He must show his friends that there wasn't any pain connected with this freezing process. They wouldn't feel a thing when it was their turn to be chilled. When Chris opened his eyes for, a moment, Morrey was bending over the case but a second later Serge was peering at him.

Chris saw the Russians features light up with joy, and he could see that he was shouting something. Immediately

Morrey's face joined that of his companion. The American, too, seemed very pleased about something, and Chris made a mental note that, when the experiment was over, he must ask why they were so excited.

But what was going on? Had the experiment been canceled? The laboratory staff was releasing the fastenings of the transparent case. Something must have gone wrong at the last moment, Chris decided. What a pity, after all the preparation! Perhaps Tony could still go through with his hypothermia.

"Are you all right?"

"How do you feel?"

Serge and Morrey were chattering away as the cover was lifted off. What were they so anxious about? Chris would have thought that his friends would be disappointed too at this sudden stopping of the process before it even began.

"I'm all right," Chris answered shortly, "but what's happened? Why has the show been called off?"

There was a second's pause as their leader's words struck Serge and Morrey.

"It wasn't called off," Morrey blurted out. "You've been out for twelve hours!"

"Nonsense! I don't believe it!" the astonished Chris declared. The assistants had been removing the apparatus attached to him, and he could now sit up. "What's going on?" he demanded.

Sir George Benson had now joined the little crowd around the astronaut's table, and Chris could see that the scientist was looking very pleased.

"It's true, Chris. Take my word for it," Benson said. "The time is ten thirty PM."

"But—" Chris spluttered, "I thought—"

"Don't worry," Sir George said. "The experiment has been completely successful, and you've discovered how easy it is."

"It's–it's incredible!" Chris gasped. "I can't remember losing consciousness for even a second. How's Tony?"

"He's coming around, too," Benson said. "Perhaps you'll be in time to see him wake up."

With assistance from Serge, Chris swung himself off the table and turned around just in time to see Tony open his eyes. Everyone was looking at the mechanic who was expressing the same disbelief that Chris had. Again it was Sir George who at last convinced the young man that held been frozen for no less than twelve hours. Chris gathered his three fellow astronauts together so that they could talk about this amazing experience. The four of them left the laboratory with Sir George and Dr. Morrison and went to the doctor's office.

"I can still hardly believe it," Chris declared. "I'm' not aware of any gap in my consciousness."

"You did feel a little sleepy at one time," Dr. Morrison said, "and at that point your vital functions ceased—or almost. When your temperature was restored, your consciousness returned as unobtrusively as it had left."

"It's just as if someone has taken away a day," Tony added. "Shall we ever get it back?"

"Maybe you will live twelve hours longer to make up for it," Morrey suggested.

"You can see, can't you, how hypothermia can prolong life almost indefinitely?" Serge observed.

"Not active life," Dr. Morrison pointed out. "Your years of activity would still be the same. Only your dormant period would be extended."

"When do we get a chance to try?" Morrey asked.

"Tomorrow—or, rather, in eleven hours' time," Dr. Morrison replied. "Now I suggest we call it a day, and you report here in the morning."

In Chris's room the astronauts talked over what had happened until long after midnight.They decided that apparently they had nothing to fear from hypothermia. It would be a welcome change if the crews of spaceships could go to sleep and then wake up seemingly only seconds later, when

they had reached their destination.

The quartet arrived promptly at University College Hospital the next morning. On the way over Serge and Morrey told their friends how fidgety they had been and how they had irritated Dr. Morrison. Chris and Tony said they wouldn't commit the same mistake.

"We'll just wander off and try to forget all about you," Chris said with a smile.

And this is what they did—or tried to do. After seeing their companions put to sleep, Chris and Tony spent a few hours wandering around London.

"I'll take you to the Old Bailey to see if there's a trial on," Chris told the mechanic, for they both knew it would be hard to avoid worrying about their friends.

A rather tedious case was in progress at the famous Central Criminal Court, and the astronauts soon lost interest. Visiting St. Paul's was more instructive, particularly since one of the vergers took them under his wing, showing them many things not usually seen by the public. In the afternoon they visited the Regents Park Zoo and spent a few hours wandering around the cages of that fascinating place.

"How much longer, Chris?"

Tony had been bursting to ask the question for hours, but he had held it back very well.

"It's now five o'clock. I don't think we should get to the hospital before nine thirty or nine fifteen at the earliest," Chris replied.

He could sympathize with Tony, for he, too, had found his thoughts wandering more and more to Serge and Morrey. To fill in time, they went to a news theater and saw the program through twice. Then they ate at one of the restaurants favored by the quartet. But with all that, they were pacing up and down the road outside the hospital long before nine o'clock that evening—anxious to see Serge and Morrey, but not wanting to bring Dr. Morrison's temper upon them.

“Come on, let’s go,” Chris said to his companion at ten minutes past the hour. Tony was only too glad to follow his friend as he strode toward the basement laboratory. Their entrance was scarcely noticed, for the staff was preparing for the reawakening. Sir George was there already. He came over at once and spoke to them.

“Did you manage to pass the day all right? The trouble with you four is that, when separated, you worry about each other. Still, having had a taste of hypothermia yourself, you haven’t been concerned about them, have you?” Benson asked.

“Er—not too much,” Tony answered with his fingers crossed.

The director wasn’t deceived.

“All right,” he said with a faint smile, “come and see how you looked just twenty-four hours ago.”

The two astronauts strode across to the transparent covers and looked at their friends. Morrey and Serge lay utterly still, far too motionless, it seemed, merely to be in a deep sleep. Chris could understand the concern Morrey and Serge had felt at seeing Tony and himself in a similar condition. However the revival took place without a hitch and before very long Chris and Tony were busy convincing the latest subjects that twelve hours had elapsed.

“Now that the four of you have experienced this time saver, have you changed your decision?” Sir George Benson asked as Chris drove the little party away from the hospital. They all answered enthusiastically that they hadn’t, for this new process was going to be a boon on long trips—with no exercises organized just to pass the time and no unnecessary observations and reports just to keep them occupied. The most distant objects would seem to be at their very doorstep. The possibilities were fantastic and wonderful.

“Right. Well, I shall want all four of you for the next test,” the scientist announced after he had listened to the comments of his young friends. “We’re going to try out the automatic equipment. You’ll be sealed in a make-believe cabin, frozen for a time, and then revived without human aid. Of course we shall

be standing by just in case anything goes wrong"

"That's hardly likely if the apparatus has been tried so many times before," Morrey said breezily.

"Nevertheless we'll be there," Sir George insisted. "You see, the automatic equipment has never been tried on humans before."

"There is just one thing more we'd like to know," Chris said quietly just before they left Sir George at his apartment.

"Oh, and what's that?" the scientist wanted to know, an innocent expression on his face.

"Nothing important," Chris replied just as casually. "We'd merely like to know where we are going."

6

"Isn't Sir George the most exasperating man you've ever met?" Tony asked.

It was the following morning, and the four astronauts were still ignorant of where their next voyage would take them. The director had smiled but refused to answer Chris's question.

"Come to my office in the morning, and I'll tell you," he'd said. "I don't want you to be awake all night talking about your next objective."

"But we'll be awake all night trying to guess," Morrey declared plaintively.

"Then if you're bleary-eyed in the morning, I won't tell you," Sir George had threatened, and they had to be content with that.

As if to add to their impatience, Sir George kept the astronauts waiting fully a quarter of an hour before his secretary led them to his private office.

"Sorry about the wait," he apologized, as he shook hands all around. "That was Cape Kennedy on the phone—just a few instructions I had to give them. Now—er—what is it you wanted to see me about?"

Chris knew Uncle George was deliberately playing with them. Well, he could do the same.

"We—er—had a long discussion last night," he said to the astonishment of his companions, "and we're a bit worried about this hypothermia. If you're planning a long voyage, we'd lose quite a slice of our lives. So we decided to withdraw from our agreement to go."

Sir George Benson was astounded, not believing his ears. He looked hard at Chris. For a moment the young astronaut

returned the scientist's gaze stonily. Then he could not control himself any longer, and he laughed out loud. Sir George could see that he had been repaid for his own teasing.

"All right. Quits," he declared, as he joined in the general laughter. "I'll come to the point right away. Your journey will be to Saturn."

Saturn! So that was it! No wonder the hypothermia stunt had been brought up. If Chris remembered correctly, this fascinating planet was no less than eight hundred million miles from Earth at its nearest point. This meant that a spaceship would have to travel anywhere up to twice that distance on a curved path to Saturn's orbit.

"As you know," the director continued as his audience absorbed the announcement, "Saturn, the ringed planet, is one of the most wonderful sights in the sky. No other body in our solar system—or, as far as we know, outside it—has these wonderful rings. The Saturn expedition is being mounted mainly to find out more about them."

Chris and his companions had often studied the planet and its rings from Earth, from Lunar City, and during a space voyage. From the base on the Moon, or from a ship in clear, empty space, Saturn had indeed been a breath-taking sight. With its ringed crown it had seemed unbelievably lovely.

"Tell us more," Chris urged. "Have you worked out a flight plan?"

"Not in detail," Sir George told them. "If hypothermia tests go well and you're quite happy about them, we'll soon work one out. When you are frozen, we won't have to worry so much about the time factor. This will be a novel condition and will widen our scope tremendously."

"How long till lift-off?" Morrey asked.

"About six months," Sir George replied. Then he added quickly as he saw the astronauts' disappointment, "but you needn't fret about the delay. Remember we can cut as big a slice as we like out of your waiting period."

"You mean put us into the deep-freeze?" Tony asked.

"What expressions you use!" the scientist protested with a laugh. "But that is what I meant. To put it another way—we can make your hypothermia tests take up as much of that half-year delay as you like."

"What about briefing?" Serge asked.

"Go to the planetarium and find out all you can about Saturn. That will do for a start," Benson instructed them. "After that we'll get one or two experts to give you additional information."

"But what do we do when we get to Saturn?" Tony wanted to know.

"All in good time," Sir George told him, "although I can tell you now that you'll be mainly concerned with the rings. We want you to have a close look at them."

"Shall we bring a piece back?" the irrepressible mechanic asked, and Chris playfully slapped his head.

"Off you go—or I shall get more questions like that," Benson said briskly. "Come and report in the morning."

The astronauts had been to the London Planetarium many times before. Their previous visits had been to familiarize themselves with the star pattern of the heavens. They had often studied the artificial sky with its hundreds of points of light. Each of them knew the names of every star they could see on the black dome. But unlike almost all other visitors to the planetarium, these young men had seen these stars—and myriads more—from space itself. They had seen them, unmasked by any terrestrial atmosphere, in their stark unwinking beauty. And they had been on very close terms with a few of the planets.

From the great observatory in Lunar City, Chris and his companions had seen the countless galaxies, each with its millions of stars and, doubtless, with tens of millions of planets. On how many of them, Chris often wondered, had life, similar to our own, developed? When would man make contact with

intelligent creatures of another system? Perhaps the strongest incentive of all astronauts was that their work was slowly bringing this historic moment nearer.

Mr. Conway was the member of the planetarium staff who had been assigned to give the four young men their first briefing. He took them inside the big domed room with its many rows of empty seats, for this was a private session. In the center of the room was the complicated apparatus which projected images of stars and planets onto the black pointed ceiling. Near one of the walls was something resembling the console of an organ. From here the projector in the center was controlled. The operator could set the projector in motion so that the procession of planets through the star field could be watched. By speeding up the motor that worked the projector, time could be telescoped and years or even centuries could seem to pass in a few seconds.

The star patterns of millennia ahead could be shown by the mere flick of a switch.

The astronauts seated themselves comfortably while Mr. Conway sat at the console. In front of him was a microphone. They heard him switch off the lights, and for a few seconds were in complete darkness except for a faint glow from a concealed light above the console. Suddenly the dome above them was studded with points of light, all in familiar star patterns.

"That's how the sky will look tonight," the voice of Mr. Conway said, reverberating in the almost empty planetarium. "If, that is, we don't get any clouds to hide it. Now here is Saturn in which, I understand, you young men are somewhat interested."

A small spot of light, projected from an electric torch in Mr. Conway's hand, wandered about the dome until it rested near one particular planet. Chris and his companions could see the rings which identified Saturn.

"The rings are not yet in their most prominent position," Mr. Conway explained. "You see, they are exactly in the plane of Saturn's equator, but this is tilted at an angle of twenty-seven

degrees to Earth's orbit. As a result, we sometimes see the rings from above, sometimes from below, and sometimes from an edge-on position. A full cycle of the ring positions takes almost thirty years. We had an edge-on position just over two years ago."

"Couldn't the rings be seen then?" asked Tony.

"Oh, yes. They appeared as a single thin line of light stretching right across the planet's disk," Mr. Conway answered. "But it needs a fair-sized telescope to see them. It will be another five years before the rings are again in their most prominent position."

There was a click of switches, and all the stars disappeared from the dome. Another switch and a greatly enlarged image of Saturn appeared.

"Now you can see some of the detail of the rings," Mr. Conway told his audience, "but while you are looking at them, I'll give you a few statistics. Saturn is the second largest planet in our solar system, being only slightly smaller than your friend Jupiter. It is nearly nine hundred million miles from the Sun, about twice as far as Jupiter. The time it takes to move once round the Sun is twenty-nine and a half of our years.

"Although Saturn has a diameter of over seventy-five thousand miles and is thirteen hundred times as large as our Earth, its mass is barely three hundred times as much. So you see Saturn is much less dense than our planet. Gravity at its surface is very little more than it is here."

While Mr. Conway talked, Chris and his crew studied the image of their next objective. Its rings certainly created a striking effect, and they could now see that several rings were inside each other.

"The rings are like the wide brim of a hat," Tony observed thoughtfully, "except that they don't touch the planet."

Tony was right. They could see quite a wide gap between the innermost ring and the surface of the planet. Then Mr. Conway's voice resumed:

"As you can see from this enlarged image, the planet has a number of concentric rings with gaps in between. The outermost ring is called Ring A, and its outside diameter—that is the tip-to-tip measurement—is nearly a hundred and seventy thousand miles. That is much more than twice the diameter of Saturn itself. Now, even though the rings stretch out so far, they are extremely thin—at least in comparison with their width. The rings are estimated to be not more than ten miles thick."

"What are they made of?" Serge asked.

"As far as we can tell, they consist of countless numbers of small solid particles each revolving around the planet like a multitude of tiny moons," Mr. Conway told them.

"So they are not solid or continuous?" Morrey enquired.

"Certainly not. We can often see through them when they are in a wide position. It has also been discovered that inner parts of the rings revolve around Saturn more rapidly than the outer parts. This is just what would happen if the rings were vast numbers of small lumps of rock. Now perhaps I'd better describe the rings and the gaps between them in more detail."

The spot of light appeared on the dome and rested on the outer ring.

"As I've told you, that is called Ring A," Mr. Conway continued. "It's one hundred seventy thousand miles across its outer diameter and is roughly ten thousand miles wide. You can see that next we have a dark gap which separates Ring A from the next one, Ring B. This gap is called the Cassini Division, after the man who discovered it in 1675. It is seventeen hundred miles wide.

"Then we come to Ring B. You see it is much brighter than Ring A. And it's less transparent, too. This probably means that it's made up of a much denser cloud of moonlets than the outer ring. It's broader than Ring A, too, being sixteen thousand miles wide. Now, inside Ring B you can see another ring, a dark one this time. This is Ring C, but is more popularly known as the Crepe Ring or the Dusky Ring, from its dark color."

"You can see Saturn through it," Tony exclaimed.

"Yes. It's much more transparent than either of the other rings," Mr. Conway agreed. "That means that there are far fewer rock pieces to reflect the light or obstruct our view of the planet. This ring is ten thousand miles wide, and you can see an empty gap of nine thousand miles between its inner edge and the planet itself."

With that Mr. Conway switched on the lights. The astronauts were no longer peering at a fascinating object in a black sky but at the empty auditorium with the strange looking projector in the center.

"Perhaps that's enough for the first session," Mr. Conway concluded with a smile. "In any case we open to the public in half an hour, so perhaps you'd better digest what I've already told you before we go on any further."

Chris and his companions thanked the lecturer and made their way out of the building. How different the hurrying traffic seemed from the calm majesty of the heavens they had just watched inside! They paused irresolutely on the pavement. Where should they go? What should they do?

"Let's see if Gill and Gail are home," Morrey suggested suddenly.

"We can't go and dump ourselves on Mrs. Patrick again," Chris protested.

"No, but we can take the girls out to a show," Morrey pointed out with a self-conscious cough.

"Better phone them first," Serge suggested cautiously. "They may not be home."

"Okay," the American agreed. "Who's got the coins?"

Since Tony produced the money for the phone call, he claimed the privilege of making it. Mrs. Patrick answered. She said the girls would be back home any minute. Tony, with much prompting from Morrey and Chris, who had squeezed into the telephone booth with him, explained that they would like to take the girls out.

"They'll be ready by the time you get here," Mrs. Patrick

assured them. But the girls had not yet arrived when the quartet reached the Patricks' Chislehurst bungalow, and Mrs. Patrick was beginning to worry.

"They should have been here by now," she explained. "Of course I don't mind when only one of them is out. The other one at home keeps in touch with her."

"We'll drive around and see if we can pick them up," Chris volunteered. So the four set off in Chris's car to look for their friends. Ten minutes later they located the twins strolling back from the shops. The girls whooped with joy when the astronauts stopped for them.

"Where have you been?" Chris asked severely. "Your mother was concerned about you."

"I'm sorry. We got into an argument with a clerk," explained Gail. "She didn't have two similar dresses, so in spite of her frantic efforts, we refused to buy."

"We thought you might like to go to a show," Morrey suggested eagerly. "What about *Hobson's Choice* at the Tivoli?"

"We've seen it," replied Gill.

"But we wouldn't mind seeing it again," Gail added demurely.

7

"The next step is to try out the automatic equipment for your hypothermia," Sir George Benson explained. "It's functioned perfectly in all conditions so far, but to give you added confidence, I'm proposing to put all four of you to sleep and to wake you up after a predetermined interval without human aid."

"How long will we be out?" Tony asked.

"I'm not going to tell you." Benson declared with a grin. "Think of what fun you'll have when you wake up and try to guess."

"When and where?" Serge wanted to know.

"In a week's time at the Cape," the director replied.

Cape Kennedy had grown to be the largest and busiest spaceport in the world. Not only were most deep-space probes launched from one of its hundreds of pads, but it dispatched the regular ferries to the Moon and to the orbiting space stations. It was from the Cape that Chris and his crew had set out on most of their incredible adventures. They knew the spaceport's vast complex of installations as well as anyone could. They were acquainted with many of the scientists and technicians who worked there. While they would be sorry to leave England and the Patrick twins, they knew that the facilities in Florida were unsurpassed. On a venture such as they were about to undertake, nothing must be left to chance. The experienced men of Cape Kennedy, their friends of long standing, would do everything possible to ensure their safe return.

One of Sir George Benson's deputies, Billy Gillanders, was a particular friend of the astronauts. The big Australian scientist

had known Chris from his school days, and Morrey, Serge, and Tony had the warmest regard for the deputy director.

It was Mr. Gillanders who met the plane bringing Sir George and his crew to the sunbaked airport at the Cape. They all shook hands enthusiastically, for it was good to see old Billy Gillanders again. Also on the tarmac to meet them was young Dr. Sanders, who had come over with his chief to supervise the assembly of the hypothermia equipment. They were a gay little party as they sipped long cool drinks in Mr. Gillanders' air-conditioned bungalow.

For some time conversation was about the personalities and projects at this exciting place: They were brought up-to-date on what was happening to other astronauts they knew. They listened with interest to an account of a marvelous new chemical fuel that was being tested in static firings. Morrey was delighted to hear that Lunar City was soon to have its own private television service. Serge was eager to see the vast new computer that had been installed since their last visit.

"You'll have your old quarters, if that's all right with you," Billy Gillanders told them. Chris was delighted, for they'd always been very comfortable in the bungalow not too far away, with Caleb to look after them.

"I suggest you go along and settle in," Sir George said a little later. "In the morning we'll go along to the cabin mockup and see the automatic cooler. And we'll be able to give you a provisional flight program."

Chris led his crew to their old bungalow and Caleb's wide grin welcomed them.

"I'll have some food ready in no time at all, Mr. Chris," he promised.

By the time the quartet had unpacked their bags and stowed away their gear, Caleb had their meal ready.

"It isn't Thanksgiving, is it?" Chris asked, seeing the turkey and pumpkin pie.

"No, Mr. Chris. It's just that I'm so glad to have you back."

After breakfast the next morning, Mr. Gillanders came in a jeep to collect the astronauts.

"Slept well?" he asked, and was assured that, as always, they had.

"We're going to see the model of your cabin," the Australian reminded them.

They tore off at the high speed that was the usual mode of travel at Cape Kennedy. Behind the jeep the inevitable cloud of dust followed them right to the vast building which looked like a gigantic hangar. The sliding doors were open, and Billy Gillanders drove his vehicle right inside.

"There she is!" he announced proudly, as the jeep shuddered to a halt.

A few yards away, nestling in a latticework of steel struts, was the cylindrical shape which had now become so familiar.

"Not very big, is it?" Morrey observed as they climbed out of the jeep.

"Doesn't have to be," Mr. Gillanders told them. "You won't be moving about much inside, and you won't have to carry vast supplies."

"Seems ghastly," Tony remarked with a shudder. He still found it difficult to accept being put into cold storage.

Greeting the men at work on the cabin, Mr. Gillanders climbed the steps leading to a platform against the entrance hatch. The astronauts followed him and peered anxiously inside. It certainly wasn't as large as some of their previous quarters, and the instruments and equipment seemed very different. Of course they wouldn't be making observations or radar communications during the journey, Chris realized. Therefore much of the apparatus used on previous voyages would be useless.

There was, however, new and different equipment in the cabin, and their couches were not of the usual pattern. Though they were still contoured, there was a ledge all around which would carry the transparent covers they could see suspended

overhead.

"How do you like it?" Mr. Gillanders asked with a smile. "Rather snug, isn't it?"

"We'll tell you more about it when we've had a look inside," Chris answered cautiously.

"Have a look around now if you like," the deputy director suggested.

It was rather a tight squeeze for all the astronauts to get inside, but they were soon immersed in a close study of the layout. Tony climbed on to the couch that was his size and tried it for comfort.

"Not so good as some I've had," he grumbled.

"You won't be conscious of it," Mr. Gillanders laughed from the hatchway. "At least not for long."

Again Tony felt that little tremor in his stomach. What they were going to do didn't seem natural. It was as if they were going to be turned into statues of stone. They would have no part in navigating their vehicle. They would be just like any other piece of apparatus, to be switched on only when required.

On the way back to the collection of buildings which included the main control room, the astronauts saw several of the tall silver ships standing on their launching pads. Around each was the usual steel gantry, a movable latticework of metal that enabled the engineers to reach all parts of the vehicle. One of the gantries, they could see, had just been rolled away from its ship, and they knew that in a few moments the tall slender shape would be climbing into the sky.

Because no astronaut, scientist, technicians or engineer could ignore a launching, Mr. Gillanders halted the jeep. Chris and his companions twisted in their seats so that they could see the blast-off.

"She's taking the crew to Lunar City for the next Mars expedition," explained the deputy director. He mentioned the names of the astronauts, and the quartet knew them well. Though launchings were commonplace, there was still an

element of risk at lift—off. Everyone at the Cape held his breath for a few critical seconds until the ship was on its way.

As they watched, they heard the imperious hooting of a klaxon warning all personnel to take cover. Half a minute later, the watchers saw a huge cloud of steam and smoke billow up from around the base of the rocket. Then, slowly, deliberately, the ship began to move. At first she lifted herself up like a tired giant emerging from an easy chair. Then she began to move faster and faster on her eager way into the blue sky. A tongue of orange flame marked the ship's progress, and the watchers did not move until the rocket could no longer be seen.

"Come on. We'd better get along," Mr. Gillanders said at last, and the little party completed the ride to Control in silence.

Sir George Benson was in conference with his other two deputy directors when Billy Gillanders arrived with his charges. Chris and his companions shook hands with the Russian, Professor Boronoff, and the American, Dr. Rosenberg, each of whom they knew well.

"We've got a rough flight program worked out," Sir George announced, "although it's by no means settled yet."

"We're dying to know," Chris said, and the astronauts bent their gaze on a sheet of paper that the director of UNEXA was holding.

"You will blast off from the spaceport at Lunar City," Sir George announced. "After a seven-minute run on the chemical motor, you will be switched to the ion drive. At the end of your journey your retro-rockets will put you in orbit around the planet, parallel to the ring system. You will stay in orbit for three days following a strenuous program of observation on the rings and the planet itself. Then you'll break orbit with the chemical motor and run home again on your ion drive. The usual procedure will be followed for the landing back on the Moon."

"And how long will the journey take?" asked Morrey.

"Nine months each way," Benson told them. "A year and a half altogether."

There were whistles of surprise. This would be the longest journey ever undertaken in space. Never before had such vast distances been attempted with men shut up for so long in a spaceship. It was obvious that the new technique of hypothermia was opening up fresh horizons for space travel. "Don't worry about the duration," Sir George went on. "To you it will be very short. Only the time in orbit around Saturn will be real to you. The rest of the trip will seem to pass in a flash."

Eighteen months! The astronauts could hardly imagine the ordeal such an undertaking would have been without this freezing process. No matter how well a crew worked together, strain usually appeared after a prolonged period in close confinement. They could all remember, a little self-consciously, how they had felt toward each other during some of their long voyages in the past. This trip to Saturn would last so much longer than any voyage they had ever made before, that if they had to be conscious throughout, they would have found it intolerable.

Also, in a conscious state, they would have had to carry vast supplies. Serge did some rapid calculations of the amount of oxygen, food, and water they would have needed. The ship, therefore, would have had to be many times larger than any yet launched. The technical problems would have been tremendous. But in a state of suspended life, the consumption of stores would be negligible. Hypothermia was truly going to be a passport to the stars.

"Now then," Sir George continued, "we're giving you a trial run tomorrow. It will be completely automatic. From the moment you enter the cabin, Control will take little part in the operation except to monitor your condition. If anything should go wrong, we'll be standing by, of course, to step in. You'll do a simulated run out, six hours of observation, and then a simulated home run."

"How long shall we be out?" Morrey asked.

"I'm not going to tell you," the director answered as he had before. "It might be anywhere from ten minutes to two weeks. I want to see if you can tell when it's all over."

“That’s not fair,” protested the American. “We won’t know how old we are when we wake up.”

“I wouldn’t worry about that.” And the scientist laughed. “You’ll only be as old as you feel. Now this afternoon you’re going back to your mock-up cabin to have a session familiarizing yourselves with the instruments.”

Later, under the guidance of Billy Gillanders, the crew once again climbed into the dummy cabin and examined more carefully the equipment they found inside. They recognized many of the instruments to be used for measuring temperature, pressure, various kinds of cosmic radiation, magnetism, and micrometeorites. There were two telescopes for use in observing the planet and its rings. There was the miniature computer without which no spaceship was complete.

“All that stuff beneath your couches is the automatic control equipment for your long sleep,” explained Mr. Gillanders from the open hatch. “It will work to a prearranged program, and you had better be back on your couches in good time before the return flight—otherwise the covers will come down on to the couches, and you’ll be shut outside.”

“What would happen then?” Tony asked. But he knew the answer and didn’t really expect a reply.

“We’ll be ready all right,” Morrey assured the deputy director. Even if they could have survived the long journey back from Saturn in a conscious state, the supply of oxygen would not have allowed it. Nor would they be carrying enough food and water to support them for more than a fraction of the nine months it would take to journey home. They would certainly have to be back on their couches long before the covers were automatically clamped down.

“What about radio?” Serge questioned.

“You won’t be around to use it much,” the big Australian reminded them. “However, you can report while you’re circling around Saturn. Remember it will take seventy-five minutes for a signal to cross the eight hundred million miles between us. So don’t expect a reply for two and a half hours.”

“It would be nearly as quick to send a postcard,” Morrey joked.

“Be a bit of a jaunt for the postman, though,” Billy pointed out.

8

"Good morning. All ready for your trip to Saturn?" Sir George Benson asked cheerfully the following day.

"All set," Chris assured him with a smile, "but I wish we knew how long we'll be away. I don't know what to tell Caleb."

"Don't worry about him," the director advised with a laugh. "I'll let him know."

"Are you coming to watch the show?" asked Tony.

"I wouldn't miss it for anything," Sir George answered with a straight face. "Now here are our trucks."

Dr. Morrison and his assistant Dr. Sanders were waiting for the astronauts at the building housing their cabin. Mr. Gillanders was also there with a typewritten sheet.

"These are your instructions to be used when you reach your objective," he explained. "Just a few simple tasks to keep you happy until the return flight. Oh, and if you want anything, call us on the radio. You'll get our reply two and a half hours later."

So they were going to make the dry run as realistic as possible, were they? Of course the crew wouldn't be weightless, but the return to consciousness, the tasks to be done, and the automatic defreezing would be very similar to that on their actual voyage—and Chris and his companions felt almost as tense as they did for a real blast-off. For were they not about to give a real test to this amazing new technique of hypothermia and its automatic control?

"Come along now. Change."

The crisp exhortation came from Dr. Morrison, who seemed anxious to get started. Beneath the brusque, efficient exterior, the doctor was feeling as taut as his "victims," for the process he'd developed was about to have its most severe test to date.

Only the actual voyage to Saturn would be more exacting.

Sir George Benson and his deputies would follow this trial very closely for on its success would depend so many more voyages to the limits of the solar system and beyond. Would the automatic equipment function correctly? And would the astronauts survive this strange, unnatural state of suspended life?

The quartet, watched curiously by the waiting technicians, went into a small side room followed by Dr. Morrison and the cheerful Dr. Sanders.

"Do you know for how long we shall be out?" Morrey asked the young medical man in a whisper.

"Haven't a clue," Dr. Sanders whispered back. "It seems to be top secret."

The two doctors gave the astronauts a medical check before their injections of antifreeze. Then, the center of a small band of scientists and assistants, they walked into the big hangar where their cabin was waiting. Sir George Benson himself was supervising the final preparations, to be sure that Chris and the others were safely on their strange couches. At last all the connections had been made, and a jumble of wires led from the recumbent young men to instruments outside which would constantly reveal their physical condition.

"All set?" Sir George asked, giving a final look around the cabin from the open hatch.

"All ready for blast-off," Chris assured him cheerfully.

"Right. Well, have a nice time." Sir George smiled to his friends as he withdrew so the hatch could be sealed. Morrey called back a sarcastic reply, but the director had gone, and the hatch was being fixed into position.

"What happens now?" asked Tony. It was very quiet in that small cabin.

"Look up there," said Serge.

Above each couch was its transparent cover. A mechanical device was lowering the covers. In a few seconds the four

astronauts would be sealed off from each other, and the freezing process would have started.

"It's spooky—I wish I knew how long we'll be asleep," Tony moaned.

Morrey grinned reassuringly. "Cheer up! It might never happen."

Chris's last action before the cover clamped down was to give a hard look at the cabin's chronometer and to memorize the time and date. It was eleven thirty A.M.—or 11.30 hours on the twenty-four-hour system—on Thursday, April 13th! He must remember to check the time again as soon as he was defrosted.

The covers were now clamped down tightly on the couches. Beneath them the four astronauts lay waiting for the hypothermia to begin. They knew that they would first feel a slight chill. Then the next they would know would be that it was all over and that they would have been unconscious for who knows how long. Each, to himself, determined that he would try to detect the moment of going to sleep and the awakening.

Tony was sure that if he concentrated he would know when he was about to begin his slumber. Suppose he tried to keep awake. It would be a laugh if he could avoid becoming unconscious long enough to startle Sir George with an unexpected message. The microphone was just above his head. He'd wait ten minutes or so after the others had passed out and then he'd speak into the mike. It was getting a bit chilly, but it would help him to keep awake deciding what he would say to Sir George.

Hey! There was something wrong! The cover was being raised again. Wasn't it supposed to stay put until the freezing was over? This wasn't a very good start for the dry run. Hope nothing like this happened on the actual trip. Perhaps it would be as well to tell Control.

Tony turned a little on his couch. Jumping cats! The other covers were up too. Chris, Morrey, and Serge were moving about. So they hadn't yet gone to sleep. What did they think about this faulty mechanism?

As for Chris, he couldn't take his eyes off the chronometer. It had jumped backward since he'd last glanced at it. Then it showed 11.30 A.M. Now it was only ten o'clock. Had it, too, gone wrong? Then the explanation hit him almost like a physical blow. Nothing had gone wrong, and they had now "arrived"!

It seemed almost incredible that the hypothermia could come and go without anyone being aware of it. Yet it must be so, for their covers were raised as they would be when their journey was over. The chronometer was showing a different time from what it had shown just a few seconds before.

"We're here!" Chris called out to his companions, and a little bewildered, they loosened their fastenings and swung themselves from their couches.

"I can't believe it," Morrey way saying. "I felt absolutely nothing."

"Nor did I," Serge agreed. "It's hard to believe we've been unconscious for—how long, Chris?"

"I can't tell," their leader answered. "The clock was at half past eleven. Now it's ten o'clock. As it's a twenty-four-hour dial, that means that we've been frozen for at least twenty—two and a half hours."

"And we don't even know what day it is," declared Morrey. "Shall we report to Control?"

"No," Chris decided. "They already know we're awake, and in any case they wouldn't reply for a hundred and fifty minutes. We'd best get on with our jobs."

Each member of the crew had certain tasks to perform. Because they were still on Earth and not circling around Saturn, their jobs were not quite the same as they would be on the actual voyage. Nevertheless, Control had drawn up an ingenious program which would occupy them for the six hours they were to remain awake.

When all his companions were fully occupied, Chris gave his first report to Control. It would be strange waiting for two and a

half hours for a reply, but that would be the time lag when they were near the planet. For six hours the crew must work as if they were in the depths of the solar system. Only gravity told them they had never left Earth, that their cabin was inside a hangar at the Florida spaceport, and that they were within a few feet of friends instead of in the terrible isolation of space.

The radio crackled, and a voice spoke.

"Control calling Saturn One," it said. "You should be conscious by the time you receive this message. Please report your condition."

Chris grinned as he heard the words. Uncle George really was going to simulate the radio time lag, for of course Chris had already sent his report.

"Saturn I calling Control," he replied into the microphone. "As already reported, everything fine. Our program is being carried out as arranged. Can we have a time check, please?"

Would Control fall for it? Maybe they would be so concerned in keeping up the phony lapse of time that they would forget to omit a vital piece of information. Normally the date was included in the time check to spaceships. Would Control remember to cut it out and so keep them guessing about the duration of their "voyage"? The crew were all burning to know how much time had elapsed since they had entered the cabin.

Of course no immediate reply to the message was expected, so the astronauts continued with their jobs, only stopping for a meal when Chris gave the order. Now the time was approaching when a response could be expected to Chris's request, and the quartet were listening eagerly for the radio.

At last it came—after the specified hundred and fifty minutes.

"Control calling Saturn One," the voice said. "We are happy to learn all is well. The director sends his regards. Stand by for time check. At the sixth pip, it will be thirteen point one five hours on—"

The rest of the message, the part containing the vital date,

was drowned in an earsplitting crackle. It was just as if a stream of radiation had struck their ship, as sometimes happened in space. Everyone knew that this wasn't radiation this time, but undoubtedly the wily Sir George Benson's way of keeping his friends in suspense. For oddly enough, the interference ceased completely just as the timepips were coming through.

"We missed part of the time check," Chris said to Control, and added a trifle sarcastically, "due no doubt to a belt of high-frequency radiation."

The exercises and the duties of each member of the crew were finished. Now they were waiting for the six hours to be up so that they could start their journey back to Earth. Would the automatic equipment function again? And would the "return flight" be as easy as the "outward journey"?

"We'd better get on our couches," Chris said, looking at the chronometer. "The time is almost up. I'd hate for any of us to miss the freeze-up—just in case we are to be shut up for some time."

"You know, I don't think we have been here very long," declared Tony. "Oh, I know you say we must have been at least twenty-two hours in the ice boxes. But couldn't the chronometer have been interfered with? How do we know that it wasn't one of Sir George's little tricks?"

"Maybe," Chris said, smiling, "but I don't think so. We'll just have to wait and see how long we've been inside when they let us out."

There was a slight click from the automatic mechanism, and they saw that their covers were coming down.

"'Bye for now. See you in a few minutes," Tony called cheerfully.

As they felt the first telltale chill, the astronauts fixed their eyes on the chronometer which they could see through the transparent shields above them. The time was precisely 16.00 hours—that is four o'clock in the afternoon. They had been at their supposed destination for the planned six hours. In what would seem no time at all they would be back on Earth. Only

the chronometer would tell them when they'd arrived.

Because they were not 100 percent sure that the instrument hadn't been altered somehow by the technicians outside, the crew glared at the timepiece with concentrated ferocity.

It was uncanny. One second the fingers on the dial showed 16.00 hours, and the next they were showing 9.00 hours. And none of the crew had seen the fingers move! As they watched, the time had suddenly altered from four o'clock in the afternoon to nine o'clock in the morning!

"Well, would you believe it!" gasped Morrey. "I never took my eyes off that clock and look what's happened!"

"Seems as if we've arrived," declared Serge, for the covers had been lifted from them.

"Let's see," Chris said as he took the microphone.

"Saturn One calling Control. Have we landed?" he asked.

Instantly the reply came back.

"Yes, you've made a perfect landing right in the target area," a voice told them with just a hint of laughter in it.

"Good. Then can we come out?" Chris asked drily, "Or do we wait for the outer casing to cool?"

"Well—er—not really," the voice replied. "However we'd like you to hang on for a few minutes to let the director get here."

"Don't mention it," Chris replied. "Do take your time."

"Gosh, I wonder how long we've been in this cabin," Tony burst out. "What's your guess, Serge?"

"Well, it will only be a guess," the Russian answered thoughtfully. "I'm sure we would have been in longer than we were at University College Hospital. I guess one week."

"Surely not that long," protested Morrey. "Remember the object of the exercise was to test out the automatic hypothermia apparatus. A few hours would be sufficient for that. I wouldn't think, in spite of the antics of the chronometer, that we've been in this cabin much more than a day."

“To me it only seems about seven hours,” Tony declared. “I don’t think we were frozen for more than a few minutes.”

“Don’t be too sure of that,” Chris advised cautiously. “If they’ve been testing out the apparatus, they would do it thoroughly. The longer they let it run, the more chance there would be of detecting any faults. So I would say we may have been confined for anything up to a fortnight.”

“We’ll know soon,” Morrey called out. “They’re taking off the hate.”

The crew could hear sounds of activity outside their cabin. Because the portholes had been covered, they were unable to see what was going on. They were watching the hatch eagerly. Suddenly it was lifted away, and smiling technicians appeared in the opening.

“Hello! Had a good trip?” one asked.

“Fine!” grunted Chris. “Let’s get out.”

Sir George and Mr. Gillanders were in the front knot of men waiting to greet the astronauts as they wriggled out of the hatch and came down the steps to the hangar floor. The scientists greeted the young men warmly, and Chris could see Dr. Morrison casting a critical eye over them. As soon as the first welcome was over, the doctor requested the quartet to follow him for a medical check.

For a moment Chris was going to protest that this was scarcely necessary, as it seemed only a few hours since their last one. Maybe it was all part of the scheme to create as nearly as possible the conditions at the end of a long trip.

“How long have we been in that thing?” Tony managed to ask Sir George as they were all hustled along in the wake of Dr. Morrison. Sir George merely replied with an enigmatic smile, and before the mechanic could persist with his inquiry, the members of the crew were seized by the medical men. At the end of half an hour they were pronounced fit and handed over to the director.

“Now do you think we might be told how long we’ve been

shut up?" asked Chris patiently.

"I think so," Sir George replied with a twinkle. "But first how long do you think it is?"

One after another the crew gave the director their estimate of the duration of their confinement, and he seemed very pleased with what he heard.

"Come on. Let's have it," Chris burst out. "Who's won?"

"None of you," Sir George said cheerfully. "You've been out of this world for two months!"

9

The faces of the astronauts registered disbelief. In that wretched cabin for two months! Nonsense. Apart from the six hours they had spent doing exercises and making phony observations, it seemed that they'd hardly been unconscious at all. The weird gyrations of the chronometer were surely not the only sign they would have for such a prolonged stay. No, it was impossible.

Sir George and Mr. Gillanders laughed at the expressions on the faces of their young friends.

"You don't believe it?" the Director asked. "Can you remember what date it was when you entered the cabin?"

"It was Thursday, April thirteenth," Serge replied promptly.

"Show them the papers, Billy," Sir George said.

The big Australian produced a sheaf of daily papers which he distributed among the astronauts. Feverishly they each turned to the front page to see the date.

"Monday, June twelfth," Chris gasped.

"So is mine," the others agreed in turn. They looked at each other blankly.

"Now do you believe in the effectiveness of hypothermia?" Sir George asked happily.

Chris and his companions were at last convinced that the hazard of time had been conquered and that space journeys of immense distances were now possible. No longer was it necessary to talk about vast ships carrying whole communities of space travelers, many of whom would be born and die on the journey to a distant star. Now a crew could be put into cold storage for perhaps an indefinite period and defrosted when the journey was over. The greatest ordeal such a crew would have

to face would be the lapse of time on earth while they had been away. Their contemporaries would all be dead, and a new generation would be there instead. To this new generation the returning travelers would indeed be a relic of the past.

"I don't feel a day older," Tony declared soberly, "and in all the two months I haven't needed a shave."

"That's because your hair stopped growing," Mr. Gillanders informed him. "No need to take shaving kits on your next trip."

"Correction," Sir George interrupted. "I'm sure you'll want to look your best while circling around Saturn. You'll be there three days, during which your beards will grow. You won't want to get back to Earth looking like creatures from outer space, will you?"

"That's a weak crack," Morrey told him.

"Sorry," the director smiled. "Now let's get back to your place for some food."

Caleb had been warned and had prepared a feast for the astronauts and their guests. During the meal Sir George and Mr. Gillanders told the young men of events that had taken place during the last two months. And they had a thousand questions to ask. It seemed as if they had really been away visiting another planet.

"The equipment seems to have functioned perfectly," Sir George said later on. "Of course all of it is being stripped down to see if it shows any internal fault. But I think we can say with confidence that the automatic hypothermia apparatus has come through the test with flying colors. By the way, we've christened it AHA. I hope you're pleased with it."

"Well, it will certainly have a tremendous effect on space travel," Chris answered thoughtfully. "It opens up new prospects of deep probes. There is no doubt now that we shall easily reach out as far as Pluto. Maybe beyond."

"Do you think we shall ever reach the nearest star?" asked Serge.

"Of course," the director answered confidently. "How long it

will be, I don't know. But AHA certainly brings it nearer."

"Your flight to Saturn," Mr. Gillanders put in, "is not only an exploration of the planets ring system. It's also a crucial test of this new technique. If it succeeds—and you see why we have every confidence in it—we can begin to plan much longer journeys. Uranus and Neptune will be within easy reach."

"I have no doubt about the technical aspect of the procedure," Chris assured the scientists. "What I'm more concerned about is the strange effects the lack of oxygen will have. We've just been at a standstill for two months. We're only a day older than we were two months ago. For such a short period it doesn't matter very much. But when we go to Saturn, it will mean that a year and a half will have been sliced clean out of our lives."

"That's true," Sir George agreed. "There are many problems to be worked out, and we shall go only one step at a time."

"Somethings just occurred to me," Tony burst out suddenly. "Suppose on a very long trip, say one lasting some years, the folks back on Earth forgot about you. How would you get back, and how would the people react toward you?"

"I don't think you need worry about being forgotten," Benson assured him. "We could erect monuments and carve on the stone: Spaceship from Betelgeuse expected back here in the year X!"

"And landings will soon be completely automatic," Mr. Gillanders pointed out. "Even if Control was out of action, it won't be long before ships will land without any human aid."

"But wouldn't we be put in museums as specimens from another age?" Tony persisted.

"If you don't shut up, well have you put in a museum now," Morrey threatened.

"When you've finished bickering," Sir George said patiently, "I'd like you to listen for a few minutes. You are to return to England for a few weeks, absorb more information about the planet, then return here by August first. You'll leave for Lunar

City a few days later and then blast-off for Saturn by the end of the month."

The astronauts were delighted that definite dates had now been fixed for their undertaking. Nothing was more discouraging than to be told that the next assignment was for some nebulous' date in the future. A specific program, with a fixed time limit, is infinitely preferable to a hazy plan with nothing tied up. Now they could get down to the job with the enthusiasm that usually characterized their preparations.

"Will you be coming back to London?" Tony asked.

"I'm afraid not," Sir George answered. "I'll be too busy at the Cape. Billy and the other fellows still have a great deal to do, and I'm staying here to see that they do it."

"When are we flying back?" asked Tony.

"The day after tomorrow," Sir George told them. "Spend as much time as you can around your cabin. You can't know it too well. I won't be seeing you myself before you go, as I've had an urgent call to go to New York. So have a good time back home, and if you see any of our mutual friends, give them my regards."

As he'd told them, the director was whisked away later that day to meet the Secretary-General of the United Nations. None of his deputies—Mr. Gillanders, Dr. Rosenberg, Professor Boronoff—knew why their chief had been summoned to New York. It was all very mysterious.

Following Sir George's instructions, the astronauts haunted the hangar housing the replica of their cabin. Tony, in particular, went over every nut and bolt, every dial and instrument, every control and switch. He felt that even had he been blindfold, he could have taken that cabin to bits and put it together again. Chris, Morrey, and Serge concentrated on the particular instruments each would use during those critical days at the climax of their journey. It seemed no time at all before they were boarding the big jet that would soon be streaking toward England.

Back in London once more, the four young men had no set duties. They were to report to the planetarium for further

briefing, but apart from that, their time was their own. It wasn't very long before someone suggested a call on the two Patrick sisters. They crowded into Chris's red sports car and roared out toward Chislehurst.

A screech of brakes brought the car to a stop at the end of the cul-de-sac outside the Patrick's bungalow. Morrey shot out of the car and in a couple of strides was at the front door. Chris, Tony, and Serge were soon with him, waiting for the opening of the front door.

It remained closed. Puzzled, Morrey rang the bell again. But still no sound came from inside.

"They must all be out," Serge said, stating the obvious.

"Let's look around the back," Morrey suggested, for he knew that their friends wouldn't mind.

They made their way through a side gate to the rear of the Patrick's bungalow. Even a cursory glance showed that it was locked up and deserted. All the windows were tightly closed.

"Looks as if they're all away," Chris said. "Let's ask one of the neighbors."

Morrey rang the bell of the next bungalow. An elderly lady opened it a few inches and peeped out.

"Excuse me," Morrey said in his nicest manner, "were friends of the Patricks. Can you tell us if they're away?"

The door opened a few inches more.

"Friends of Mr. and Mrs. Patrick?" the lady asked doubtfully.

"Perhaps it's more correct to say were friends of Gail and Gill," Chris interposed. "We came here without letting them know. Are they off on a holiday?"

"I don't think so," the lady replied. "They went away two days ago, and Mr. Patrick came back last night for their mail. He told me they are staying in Bloomsbury."

"Staying in Bloomsbury?" Chris echoed in astonishment. This was almost in the center of London, barely sixteen miles away. Why would the family want to stay there?

“Do you know at which hotel?” Morrey asked, but the lady was unable to help. Thanking her courteously, the astronauts returned to Chris’s car.

“Let’s go and look for them,” suggested Morrey, and Chris whisked his car back towards the metropolis.

“Where shall we look?” inquired Serge.

“I’ll park the car. Then we’ll split up and visit as many hotels as possible to ask if the Patricks are staying there. Let’s meet at the car in a couple of hours, which should be long enough,” Chris suggested.

Serge was back at the car in less than half an hour. He’d been the lucky one to find the hotel at which Mr. and Mrs. Patrick and their daughters were staying. He found it most tedious waiting for the others to return.

“Well, what’s the news?” Chris asked his Russian friend as soon as he saw him. In the distance Morrey and Tony were walking towards them.

“I’ve found them,” Serge answered. “At least I’ve found their hotel.”

At a signal from Chris, Tony and Morrey had broken into a run, and now they arrived in time to hear their friends report.

“I asked if they were in the hotel,” Serge was saying, “but the porter told me they’d been out all day. He said he thought they had all gone to University College Hospital.”

“Hospital!” exclaimed Morrey. “Is one of them ill?”

“I wouldn’t think so,” Serge answered. “Maybe they are visiting a sick friend.”

“But why stay in a hotel? They could travel from home to visit the hospital, couldn’t they?” asked Tony.

“Maybe whoever they’re visiting is seriously ill, and they want to be close at hand,” suggested the American. “What do you think, Chris?”

Their leader had been doing some rapid thinking. As far as he knew, the Patricks hadn’t any close friend or relative whose

illness would warrant the whole family staying in a nearby hotel. And the more he thought of it, the more he was struck by the fact that the hospital was University College. Of course, there was a chance that the Patricks really had a friend there. But it was strange that of all the dozens in London, it was the same hospital that had introduced them to hypothermia.

"I think there's something peculiar going on," Chris answered slowly.

10

"What do you mean, Chris?" Tony wanted to know.

"Let's go along and find out, shall we?" suggested their leader.

Mystified, they scrambled into the red car and were soon weaving their way through the traffic. A few minutes later Chris parked his vehicle neatly in the car park outside the hospital.

"We'll know in a few minutes," he said meaningly. "Follow me."

Puzzled, they followed Chris over familiar ground—down to the hypothermia unit!

The quartet had almost reached their objective when they saw two familiar figures walking toward them—Mr. and Mrs. Patrick.

"I knew it!" Chris muttered under his breath, but he acted as surprised as his companions when they exchanged greetings.

"What are you doing here? Where are Gail and Gill?" Morrey burst out. "They're not ill, are they?"

"Oh no," Mr. Patrick answered quickly. "They are here for some experiments."

"Not hypothermia?" Tony gasped.

"Er—yes. They have been coming for some time, since shortly after you went to Florida," the girls' mother volunteered.

"But what are they doing? Have they been put into the freezer?" Morrey spluttered.

"Yes, they've both been under hypothermia," Mr. Patrick admitted. "Actually Gail is under at the moment. We've been to see her. We were very upset at first, but we're not worried now.

Still—we like to be around when these experiments are going on."

"What about Gill? Is she with Gail?" asked Serge.

"Yes," said Mr. Patrick. "No doubt you can go and see her."

"How long will Gail be under?" Chris inquired.

"We were told to be back in two hours," the father said, "so I expect she'll be coming around any time after that. Now if you'll excuse us we both want to dash out to Chislehurst to see to things at the bungalow. Shall we be seeing you this evening?"

"You bet!" Morrey declared firmly. "I'm sticking around till Gail's defrosted."

As soon as Mr. and Mrs. Patrick left, the astronauts made their way through some swinging doors into the part of the basement devoted to these experiments. It seemed only a few days since they themselves had been here for freezing, yet it was three months ago, and the technician they met didn't recognize them at first. However, he soon remembered, and took them to the doctor's room.

To their surprise, Dr. Morrison was there with several other men whom they didn't know. And in the center of the group was Gill Patrick.

As soon as she saw the astronauts, Gill flushed with pleasure. She broke away from Morrison and his colleagues to greet her friends warmly. It didn't worry the astronauts a bit that the doctor looked far from pleased at their intrusion.

"What have you and Gail been up to?" Chris asked the girl, ignoring Morrison's irritation.

"Oh, just following your example," Gill answered innocently. "Nothing wrong with that, is there?"

"You and Gail have been undergoing these hypothermia experiments?" Morrey demanded severely.

"Why not?" the girl asked with a toss of her head. "If you can be put into cold storage, why can't we? Anyhow, we've proved we can undergo hypothermia as well as you."

"What happened? How did you get started?" Serge asked.

"It was hearing you talk so much about it when you visited us," Gill confessed. "After you'd gone to Florida, we asked for an interview with Dr. Morrison. We had to wait until he came back from seeing you put to sleep. At first he didn't want to give us a trial," the girl told them with a quick glance in the direction of the frowning doctor. "We suggested he might want to test out our telepathy while one of us was frozen. That did it. He saw us, and we've both had several trials."

"Does your telepathy work?" Chris asked.

"We don't know yet, but Dr. Morrison thinks it may. We still have a number of tests to do."

"Let's ask the old bird if we can see Gail," Morrey suggested.

Led by Gill, the astronauts walked back to where the doctor, a forbidding frown on his face, was waiting.

"Oh, Doctor," Gill asked sweetly, "can Chris and the rest of the crew have a peep at my sister?"

"Certainly not," Morrison answered brusquely. "You know quite well that we must concentrate on the test we are to make as your sister is awakened."

"Just for a minute please," Morrey pleaded.

Dr. Morrison's face flushed as he looked even more stubborn.

"Under no circumstances will I permit you to visit the subject. And I must ask you to leave the hypothermia unit at once."

There seemed nothing that Chris and his friends could do, so feeling very upset, they turned to make their way to the door. But if there was nothing the astronauts could do to make Dr. Morrison change his mind, there was certainly something Gill could do.

"Good—bye, Doctor," she said with a dazzling smile as she prepared to follow her friends through the door.

"And just where do you think you're going, young lady?"

demanded the irate doctor.

"Back to the hotel with my friends," she answered coolly.

"But you know you are needed here. I forbid you to leave," Morrison stormed.

"Sorry, Doctor. After your refusal to allow my friends to see Gail, I'm far too upset to be of any further use to you. Mother and Dad will be around to collect Gail when she wakes up. Good-bye."

"Come back!" the doctor raged. "I will not permit you to ruin this test. I will not allow you to go."

Morrey, a dangerous smile on his face, turned slowly and faced Morrison.

"And just how do you propose to stop her?" he drawled, drawing himself up to his full six feet two inches.

"But—but we must complete the test," Morrison protested. There was an awkward pause.

"Very well," he conceded, breathing hard, "you may go in and look at the subject for two minutes. No more. Then I shall require your services, Miss Patrick," he concluded icily.

Without waiting for the doctor to change his mind, the astronauts slid quietly through the door into the room they knew so well. In the center was the table with its transparent cover. And beneath the cover lay the still, deathlike figure of Gail Patrick. Even though they were now so familiar with this amazing technique, it was a shock to see her. After a few moments they turned and followed Gill from the room.

"Go back to our hotel," suggested Gill. "We'll be able to spend an hour with you before we turn in. You'll probably find that Mother and Dad have already left to come here."

"How long will you be?" Morrey asked.

"Gail will be up in ten minutes, so it shouldn't be more than three quarters of an hour before we join you," the girl told them.

It was nearly an hour later when the astronauts, waiting

impatiently in the hotel lounge, saw the twins, followed by their parents, push their way through the revolving doors. As one man they rushed forward to greet the slightly breathless Gail, all of them talking at once. Mr. and Mrs. Patrick left the young people while they went upstairs to their bedroom to get rid of their coats.

"Not too bad, is it?" Tony was saying to Gail.

"Never felt a thing," the girl assured her friends. "When you told us you didn't know you'd been frozen, we hardly believed you. Now we both know it's true, don't we, Gill?"

"Every time I've had it, someone has had to tell me it was over," Gill agreed.

"But why are you doing this—apart from the telepathy part?" Morrey wanted to know. "You aren't thinking of taking a long space journey, are you?"

Was it the American's imagination or did he detect something between the twins?

"If you really want to know why we volunteered for hypothermia," Gill told them, "it's because we don't see why you four should stay young while we get older."

The astronauts looked at the twins in astonishment.

"Girls!" exploded Tony.

"You've already gained two months on us at the Cape," explained Gail hastily. "How long will you be away on the next trip?"

"Eighteen months," Serge told her.

"There you are, you see. When you come back, we'll be eighteen months older, but you'll be just the same. If we let you four have it all your own way, we might be old ladies while you're still young men," Gill added patiently.

"Rot," spluttered Morrey. "We're not likely to go on any trips that long. In any case, you're crazy if you think you can persuade Morrison or anyone else to put you both into cold storage while were away."

"No, I suppose not," Gill sighed. "We'll just have to resign ourselves to being old and haggard by the time we see you again."

Next morning the astronauts, by appointment, reported to Mr. Conway at the planetarium. They had arranged to be at the hypothermia unit that evening when it would be Gill's turn to be frozen. Meanwhile, they still had a great deal to learn about the spectacular planet they were to visit.

When they were seated in the vast dark auditorium, Mr. Conway went to the console. A switch flicked, and a huge image of Saturn and its rings appeared on the black dome above their heads.

"Let me remind you," the lecturer began, "about the dimensions of this ring system. From tip to tip of Ring A that is, the outer one—the distance is one hundred and seventy thousand miles. Compared with this width, the rings are remarkably thin, being a mere ten to forty miles deep. It is the equivalent of a basketball surrounded by a very thin paper ring a yard in diameter."

"So that is why we can scarcely see it when it's edge-on," Chris observed.

"No more than you would see the paper ring around the basketball when that was exactly edge-on," Mr. Conway agreed. "But now let us examine the rings in greater detail."

"You'll see that the outer ring, Ring A, which is ten thousand miles wide, isn't continuous. There's a gap in it called Enke's Division. It's nearer the outer edge than the inner edge of the ring."

Yes, it was quite plain to the watching quartet, and Mr. Conway let his audience gaze on the image above them for some time before resuming.

"Now let's jump over Cassini's Division, which is seventeen hundred miles wide, to Ring B. As you see, this is much brighter than Ring A, and half as wide again. In this ring you will see two

small divisions which roughly divide the ring into three. Then there is another gap, and we come to Ring C, the Crepe Ring. Notice from the image that we can see the surface of the planet quite plainly through the Crepe Ring.

"If the theory is correct that the rings consist of millions of pieces of rock or ice, then they are very numerous in Ring B. This makes the ring more opaque and able to reflect a great deal of light. Ring A cannot have so many particles, while the Crepe Ring must have far fewer. The luminosity of the rings depends on the density of their constituent lumps."

"How have they been formed?" Morrey asked.

"There are one or two theories," Mr. Conway told them. "The first is that at some time some of the planet's moons shattered into fragments, each forming a ring as the fragments became scattered in orbit around the planet. The other theory is that the rings are formed by an accumulation of tenuous matter surrounding Saturn and that new moons are in the process of formation."

"How many moons has Saturn?" asked Serge.

"Nine, possibly ten," the lecturer answered. "Only one, Titan, is of any real size. Indeed it is the largest satellite in the Solar System, being almost as big as Mars—certainly bigger than Mercury."

Another switch clicked, and now the image of Saturn was surrounded by its family of moons.

"That is Titan," Mr. Conway went on, picking out the largest moon with his spotlight. "It's three quarters of a million miles from Saturn. As you can see, it is the sixth moon in order of distance from the planet."

Mr. Conway went on to describe Titan in more detail, telling the astronauts about its atmosphere, density, probable surface features, and that it always, as does our Moon, keeps one face turned toward its primary. Then, one by one, he told them all that was known about the other moons in Saturn's family, and it was a fascinating story. It was surprising how quickly the time went. Mr. Conway found it necessary to call a halt to the

eager questions of the astronauts, since the doors were to be opened to the general public in fifteen minutes.

"Gosh, we've missed lunch," exclaimed Tony, as they came out into the street. "Let's see if we can get a snack."

Well before the time they had arranged, Chris and his crew were making their way towards University College Hospital. Keeping a wary eye open for Dr. Morrison, they made their way down to the Hypo Unit, as they called it. With Chris in the lead they had almost reached the door when it opened and a tall familiar figure came out. The astronauts stopped in astonishment. It was the director himself.

Immediately it flashed into Chris's mind that their flight had been canceled. He remembered the urgent call for Sir George Benson to go to New York, just as they were leaving the Cape. From the look on the director's face, he could see that something was seriously wrong. If the voyage to Saturn hadn't been canceled, it was something of equal magnitude. Rarely had Chris seen his friend's face so grave.

11

"I thought you would be here," Benson said sharply. "Please come with me to Dr. Morrison's office."

Sir George's curt tone meant that either he was very angry with the astronauts or that something had happened to disturb him greatly. Chris and the others wondered what the trouble was as they followed their chief. As far as they knew, they'd done nothing to upset him. They conjectured that the summons to UNEXA headquarters was the cause of his distress.

"Your trip to Saturn is off," Sir George declared as soon as they were in Dr. Morrison's office.

The astronauts were stunned. Apart from any personal feeling of disappointment, they knew what a stupendous waste of effort and money this cancellation signified.

"What's happened?" was all Chris could say.

"Our astronomers have just discovered a brand-new meteor shower which has entered the Solar System. It's due in the region of Saturn at the same time we had you scheduled. We can't risk an argument between a meteor and Saturn One, so your voyage is canceled," the director concluded unhappily.

"But can't we just postpone it?" Morrey burst out. "Couldn't we wait till the shower had passed by?"

"Unfortunately, no. It seems that this isn't the usual type of shower. The meteors are very widely scattered, and the region of Saturn will be unsafe for many months," Benson replied.

"We'll risk it," Tony declared stoutly.

"You jolly well won't," the director declared, his set face softening for a moment at the young mechanic's words. "If you were conscious during the voyage and able to take evasive action if a meteor showed on the radar screen, we'd have a go.

But, my friends, you'll all be flat out, nicely frozen, when you reach the region of danger."

"Couldn't we be defrosted before we get that far?" asked Morrey.

"No. We've gone into all that. We should have to keep you conscious for months to be safe. You couldn't stand it, and we couldn't provide enough food and oxygen," Sir George told them.

"But couldn't Control at the Cape take the necessary evasive action?" Serge insisted. "You could arrange to get a signal if a meteor showed up on the screen."

"The time lag beats us. Remember that from the region of Saturn it would take a radio message seventy-five minutes to reach us, and another seventy-five for our command signal to go back. We wouldn't have more than ten minutes to play with," the director informed his listeners.

The astronauts felt terribly let down. After all their training and preparation, after thinking for months of nothing but their space flight, it came as a terrible blow to learn that it was off. Now they would have to readjust themselves, to unwind after they had been tensed up to visit Saturn. What an anticlimax.

"Come on. Let's find the girls," Morrey urged.

There was nothing further to say about what they had just heard. They might just as well go and meet their friends as they had planned. So, still struggling to adjust themselves to the bitter disappointment of Sir George's announcement, the four young men said their good-byes and, leaving their friend, walked slowly toward the hypothermia unit. In a few moments Gill would be brought around, and they would be able to tell the twins what they had just heard.

Inside the lab, as they expected, Gill lay motionless beneath the transparent shield. But Chris noticed something unusual. In addition to the usual electrical connections there were a number of additional wires leading from the unconscious girl's head. Neither he nor any of his crew had ever worn this headgear in any of their own sessions.

“Electroencephalograph,” said a voice behind the astronauts. “Or EEC for short.”

They turned round to see Dr. Morrison. For a change the quick-tempered doctor seemed quite pleased—an obvious sign that his experiments were going well.

“What are you using it for?” Chris asked curiously.

The doctor was in a rare, expansive mood and seemed happy to explain.

“An EEG is an instrument which records the tiny electric currents which are always flashing through the brain. Usually this instrument is used to diagnose conditions of the brain, for a great deal can be learned from the shape of the tracings on the moving paper,” he told them.

He directed their attention to a nearby piece of apparatus to which the wires from Gill’s head ran. A roll of paper was unrolling, and a needle was drawing on it a wavy line. In some respects it was similar to other types of recorders with which they were familiar. Dr. Morrison took a length of the paper for his audience to examine the line left by the pen.

“You’ll see that the brain of the subject is almost, but not quite, inactive during hypothermia,” he said, indicating that the line was almost flat.

“Now here,” Dr. Morrison went on, “Gill’s sister was trying to communicate with her. You’ll see that the trace has a number of short zigzags. The telepathy must have stimulated the electric currents in Gill’s brain, for the needle was much more active as you can see.”

“Can we see Gail?” asked Morrey.

“Yes, if you won’t distract her too much,” Dr. Morrison agreed affably. “She’s going to have another try at communication in five minutes, during which we shall revive Gill, and Gail will record just when she gets her sister’s thoughts back.”

“The conscious twin doesn’t get anything back from the unconscious one?” asked Serge.

"Yes, but nothing intelligible," the doctor told them. "What she gets is just like a carrier wave on an otherwise silent radio. You know that the station is on the air but isn't broadcasting."

They entered the room where Gail was reclining in an easy chair. She smiled a greeting to the newcomers, but Dr. Morrison silenced her with a wave of his hand. Young Dr. Sanders was standing behind Gail's chair, notebook and stopwatch in hand.

"I'll leave you and get back to the other twin," Dr. Morrison said. He went out, and then at a word from Dr. Sanders, Gail closed her eyes and began to concentrate on trying to enter her sister's thoughts:

Soon the experiment was over. Dr. Morrison returned with the paper roll and showed how the recording pen had oscillated when Gail was trying to communicate with Gill.

A few minutes later Gill was revived and came to join her sister and the astronauts.

"What's the matter with you four?" Gill asked the young men.

"Oh, yes, I thought you were looking very solemn. What is it?" Gail wanted to know.

It was Chris who spoke for them all.

"Our Saturn flight has been canceled," he told them. "Sir George has just informed us."

Chris had to explain about the unexpected meteor shower and the need for instant communication during the flight. Dr. Morrison listened intently.

"What a shame!" declared Gail. "If only Gill or I could have gone with you, we could have overcome that difficulty."

The astronauts remembered when one of the girls had accompanied them on their voyage to Mercury. Then the uncanny gift of telepathy had saved their lives by crossing the millions of miles of space instantaneously. Radio communication, because of the vast distance from Control, would have been too slow to save the ship. The signal flashed

between the two girls had enabled the ship to be diverted from a collision course with an expended deep-space probe. Something like that was needed on the Saturn expedition.

"If it hadn't been for this hypothermia, we could have done it for you," Gail sighed. "But with one of us frozen we couldn't exchange messages."

"I'm not so sure," Dr. Morrison said thoughtfully. He'd been studying the recording of the brain machine intently. "Would one of you care to have another short spell on the slab?"

"What's the idea, Doctor?" Morrey asked. "Surely the girls have done enough for today?"

"Yes, yes, I know that," the doctor agreed quickly. "It's just that an idea has flashed through my mind, and I'd like to test it out."

"What is it?" asked Serge.

"I want to connect both girls to an electroencephalograph," Morrison replied. "I want to see if we can record the 'carrier wave' coming from the frozen subject. If we can, it might be possible to impose coded information upon it."

"I'm afraid I don't understand," Morrey interposed.

Morrison became quite excited as he tried to explain.

"We've proved that there is communication between the girls, even under hypothermia," he said. "If we could find a way of using that communication to bring a swift warning to Control, then your expedition might be possible after all."

"You mean, you think if one of the girls came with us, she'd be able to let Control know of any danger?" asked the astonished Chris.

"Something like that," the doctor conceded. "But at the moment it's only the germ of an idea. The first step is to see if we can use the EEG to detect emissions from the hypothermia subject. Now will you girls have a go?"

The twins must have been discussing the doctor's request in their own strange manner, for they both assured him that they

were willing. Gail agreed to be frozen, while Gill settled down at the receiving end. Both girls were connected up to separate EEGs. As soon as Gail had gone under, her tracing changed to a slightly wavering line. Gill's, however, continued to oscillate, her active mind obscuring any reception from her sister.

"It's no use," Dr. Morrison announced at last. "It won't work. However, it was an interesting experiment."

"Suppose Dr. Morrison had hit on something. Would one of you come with us?" Morrey asked the twins.

They were back at the hotel. The girls' mother and father had gone to bed, leaving the young people to talk over the happenings of the day. At the American's question, the sisters showed some embarrassment. It was impossible to guess what discussion was flashing between them, and after a moment Gill spoke.

"We did hope that one of us could come with you. That's really why we persuaded Dr. Morrison to experiment on us," the girl confessed. "Since I went with you to Jupiter, we thought it was Gail's turn now. We were going to press for her to join the crew."

"I knew there was something," Chris declared. "You didn't want us to leave you behind, did you? At least not both of you. Well, I'm sorry the whole thing is washed out, so even if you had persuaded Sir George to let Gail come along, it would have been no good."

"Well, we—er—changed our minds afterward," Gail admitted. "You see, when we came to think about it, we realized that whoever went to Saturn would be frozen for eighteen months, while the other one was getting older back on Earth. When the expedition was over and the ship returned to Earth, we wouldn't be twins anymore, don't you see?"

The astronauts had no answer to this novel argument. In effect, the twin left on Earth would age by a year and a half, but the one making the space flight under hypothermia would be only a few days older. Since the twins were so attached to each

other, their friends could understand how impossible a sudden difference in age could be.

"We've had to insist on exactly the same periods in the freeze," Gill admitted.

"So you wouldn't mind if Gail came with us if you could be frozen at the same time?" Tony said with a laugh.

"Oh, no, we wouldn't mind that," both girls said together. "We just want to remain twins!"

There was scarcely any traffic about when the astronauts were driving back to their quarters. Which was just as well, for Chris, who was driving, suddenly stopped the car with a screeching of tires.

"Hey! What's up?" Morrey, who had bumped his head, demanded angrily.

"Take over the wheel," Chris ordered. "I want to think."

Although Morrey obliged he, Tony, and Serge were completely mystified by their leader's conduct. Chris was so deeply immersed in thought that they, too, fell silent until they reached their lodgings.

"I wonder it Dr. Morrison is still at the hospital," Chris said, still sitting in the car after his companions were outside.

"I wouldn't think so," Tony answered, "but what's biting you, Chris? What do you want with Dr. Morrison?"

"No. I'd better talk to the girls first," Chris went on, oblivious of Tony's question.

"He's ill," Morrey declared. "Here, Serge, help me yank him out of the car and put him to bed."

"No, no. I'm all right," Chris said hastily, as his companions prepared to go into action. "It's just that I've had an idea which might, just might, save our expedition. Put the car away, Morrey, and I'll tell you all about it upstairs."

A few minutes later the quartet was gathered in Chris's bedroom. While Chris sank into an easy chair, the other three sprawled across their leader's bed. He must have been

engrossed with his idea, for instead of indignantly ordering them out, he let them remain.

"What's it all about, Chris?" Serge asked.

"Oh, it's just an idea," the leader explained, "and even if it worked, the girls would have to agree. Besides—I doubt whether there'd be time to develop the necessary apparatus."

"What on earth are you talking about?" demanded Morrey. "Have you gone crazy, or have we?"

"Sorry," Chris apologized. "I know it sounds crazy, but it's no worse than some of the other things we've got away with. Just listen for a few minutes, and I'll explain."

Although his bed was by now a complete shambles, Chris didn't even notice. He was too full of the fantastic idea that had flashed into his mind. Would his companions agree that it gave them a chance, though a very slim one, of voyaging to Saturn? Or was his idea completely impractical and merely the result of intense disappointment at the cancellation of the trip?

12

"You remember," Chris began, "that although the EEG recorded transmission between Gail and Gill, only the apparatus connected to Gill in deep freeze was decipherable. The other tracings were swamped by Gail's conscious mental activity. You also remember," he continued, "what they said about the possibility of one of them going on the Saturn expedition. Then, after thinking it over, the girls decided that neither of them would go because the hypothermia of one might result in the loss of their twin identity."

Morrey, Serge and Tony were listening intently, but Chris hadn't yet said what he had in mind.

"It's simple really," their leader went on. "If the girls—both the one in the space ship and the one at Control were put into cold storage together, it would keep them the same age. By eliminating the conscious thoughts of the one on Earth, the EEG should be able to record transmissions from the ship."

"You mean if Gail came with us, Gill should also be under hypo at Control?" asked Morrey.

"That's it in a nutshell," Chris agreed. "It would overcome their objection to Gill being eighteen months older than Gail at the end of the trip. I also think there is a very good chance of recording their telepathy transmissions both ways."

"If that could be done, Sir George would let us go to Saturn after all," declared Tony in growing excitement.

"Not so fast," his leader cautioned. "We don't know yet whether it will work. More important, we don't know whether the girls will agree. I think that we have to ask them how they feel about it, before we mention this brainstorm to Uncle George or Doctor Morrison."

The astronauts were in full agreement with Chris over this.

Morrey wanted to race back to the girls' hotel and settle the matter at once. Chris managed to restrain the enthusiastic American with a promise that they would call on the Patricks the very first thing the next day.

And Chris had to restrain his crew from being at the Patricks' Bloomsbury hotel at the crack of dawn.

"We must give them time to have breakfast," he insisted. "Nine o'clock is quite early enough."

Promptly at that hour the four young men were at the reception desk asking for their friends. The receptionist informed the astronauts that the Patricks had already breakfasted, preparatory to checking out, and that the girls would be down in a few minutes.

"I wonder what's happened. Why are they going home?" Tony whispered.

"There wasn't a hint of leaving last night," Serge pointed out.

"If you'll all be patient, we'll know in a few minutes," Chris advised.

Sure enough, in less than five minutes the twins, slightly breathless, came tripping across to the four young men.

"Oh we're so glad you came," Gill said. "We were going to leave a note at the reception desk."

"But why this sudden departure?" Morrey asked. "The hotel people aren't turning you out, are they?"

"Fathead," Gail called. "No. We had an early morning phone call from Dr. Morrison. He won't be conducting any more experiments and won't want us again. And Mom and Dad are anxious to get back home."

"So are we," added Gill. "Although I'm sorry we haven't been of much use to Dr. Morrison."

"You may still be of use to him—you could even save our expedition," Chris said earnestly. "Will you listen while I tell you what's been going through my mind?"

Of course the girls listened, while Chris, backed up by the

other three, explained his idea. At the end of the recital the four astronauts looked anxiously at the twins to see what their reaction was. Without the cooperation of the girls, the whole thing would be impossible. They would have to abandon the faint hope for the expedition which Chris's suggestion had revived.

They need not have worried. The reaction of Gill and Gail was both forceful and affirmative.

"Why of course we'll do it," Gill said at once, while Gail nodded. "How could you have any doubt?"

"Let's get Sir George and Dr. Morrison at once," Gail cried enthusiastically. "There's no time to lose."

"You're absolutely right," Chris agreed. "Even if all goes well, it will be some weeks before we can blast-off. And Saturn will be getting farther away."

"What about your parents? Shouldn't you consult them?" Serge asked quietly.

"Yes, of course," Gill admitted, a trifle shamefaced. "But I expect they will agree. Mom and Dad are resigned to all our experiments."

Mr. and Mrs. Patrick had six enthusiastic young people to talk them into agreeing to the project, and, of course, they hadn't a chance.

"All right. How long will you be away?" the girls' father said, sighing.

"Eighteen months, sir," Chris answered on behalf of them all.

A look of consternation came over Mrs. Patrick's face.

"You can't go," she wailed. "You'll miss your twenty-first birthday."

The girls ran and embraced their mother.

"Don't worry, Mom," Gail said. "Our ages will be at a standstill while we're in the deep freeze. We can have our party when we get back."

"It will give your friends eighteen months longer to save up

for presents," Morrey teased, and the twins agreed that this was a good idea.

Sir George Benson was persuaded to postpone his return to the Cape, and Dr. Morrison agreed to put off an important medical conference. The excitement was terrific as the twins prepared to submit themselves to the crucial test. To separate them as much as possible, a hypothermia unit was carted up to a small empty ward on the top floor of the hospital. Gail was to be in the basement and Gill on the top floor. A telephone connected the two rooms. Dr. Sanders was to look after Gill, while his senior colleague remained in the basement laboratory with Gail. The astronauts, too, broke up, with Chris and Morrey remaining down below, while Serge and Tony were stationed above.

"Connect up," Dr. Morrison barked into the telephone to Dr. Sanders, and the complicated business of fixing the EEG leads to the girls' heads began.

"Gill says it's worse than being at the hairdresser's," Gail said suddenly to Morrey and Chris, who were watching with interest.

"Tell her I'll treat you both to a new hairdo when this is over," Sir George informed the girl with a smile.

"She says there's an expensive place in New Bond Street," Gail said a few seconds later, and the director groaned in mock despair.

"All set," Dr. Morrison announced at last. "I'll just phone Sanders to see if he's finished."

"No need to," Gail told him. "He's told Gill he'll be another couple of minutes."

"Chris gave Morrey a secret nudge as they saw the strange look on Dr. Morrison's face.

"Ready," Gail said a little later, but the dubious doctor had to confirm it by means of the phone.

The transparent covers were lowered, the apparatus switched on, and the watchers bent over the two subjects. Dr.

Morrison below and his colleague up above were bending over the EEG machines. Almost simultaneously the oscillation of the two tracings flattened out as both twins went under.

"What now?" whispered Sir George Benson to Morrison. No one noticed how, in this crucial moment, the director had lowered his voice. All in the room knew that the next few minutes were decisive.

"I'm going to administer a minute electric shock," Dr. Morrison replied. "If she were awake, it would be too weak for Gail to notice. However it should affect the needle on our EEG, and I want to see if Sanders gets any result on his."

Sir George and the astronauts held their breath as Morrison put his plan into operation. On the result would depend whether or not they could still make that fantastic journey which had seemed to open new vistas.

The doctor pressed a switch, and a tiny current ran along wires to the unconscious Gail's head. Immediately there was a pronounced flicker of the recording pen, and the liner on the paper roll showed several sharp pinnacles. Immediately Morrison rushed to the phone to speak to Dr. Sanders.

"Got anything?" he barked.

Those in the basement laboratory waited tensely for the answer. Chris could feel perspiration on his forehead. Morrey was unusually pale. Sir George's face was grim. Suddenly Dr. Morrison's face lighted up in a rare smile.

"You have? Good. Now I'm repeating it several times. Phone me the count, will you?" he said, replacing the receiver.

"Sanders definitely got a reading," he announced, "but it's insufficient to prove anything yet. I'm going to repeat the stimulation seven times and see if Sanders gets the same number."

"Make it five, then a break, then two," suggested the director, and Morrison nodded his agreement.

"Like sending Morse code," Morrey whispered to Chris, as they watched the doctor send the boosts of current through

Gail's brain. A few seconds later the phone rang, and the doctor listened intently.

"Was there any break?" he asked. Then he put the instrument back.

"So far, so good," he told Sir George and the astronauts. "Sanders gave me the pattern correctly. I'll send a few more signals; then we'll compare the tracings together."

When the two rolls of paper, one from Gail's EEG machine and one from Gill's, were compared, it proved beyond doubt that the unconscious minds of the girls were linked together. Everyone was delighted, but at Sir George's request another hour was spent in flashing "messages" from one twin to another. The astronauts even devised a code and transmitted humorous comments to each other.

At last the two girls were defrosted, and the first question of each was, "Has it worked?"

In answer Sir George turned to Dr. Morrison.

"Can I use your phone?" he asked. "I'm getting on to the Cape and ordering a fifth couch for Saturn One."

A shout of delight went up from the six young people, but while the director was waiting for his call to come through, he warned the astronauts: "There's still a lot to do before we can be sure it's safe to remount the expedition. We still have to find the means of utilizing these transmissions between Gail and Gill. It won't be easy to translate the spaceship's radar scan into stimuli for the transmitting brain. Neither will it be simple to read the results back in Control. Perhaps the most difficult part will be for Control to send back instructions, and for those instructions to be turned into action in the ship."

This warning introduced a sober note. It seemed that only a beginning had been made toward overcoming the problem created by the meteor shower. Now it was up to the electronic experts to see if they could build apparatus that could utilize their new form of transmission. There wasn't much time.

In a crisis of this sort, Sir George Benson showed his mettle.

It was not often that the director forced his colleagues to work at such a pace. Even as his plane was tearing back toward Cape Kennedy, the greatest electronic experts of Britain, the United States, and the Soviet Union were hastily packing bags to join him. Billy Gillanders and the other two deputy directors knew they were in for a rough time, but, like true men of science, they felt nothing but exhilaration for the challenging task that faced them.

Back in London, the four astronauts and the twins were saying good-bye to their friends. Mr. and Mrs. Patrick had to face the fact that they would not see their daughters for almost two years. It took all their courage to keep the farewells so breezy.

But at last it was over, and the six young people were collected by an air-force minibus and driven to Farnborough. There they had a brief, but intense, spell of preparation for the physical stresses ahead. Gail, who was the twin chosen to go on the expedition, received special attention. After ten days the chief medical officer pronounced all six fit and bundled them off to Florida.

No one met the plane as it landed at the great spaceport, Everyone was too busy for this unnecessary formality. Chris commandeered one of the station wagons always waiting for that purpose. Talking excitedly, the four young men and the two girls drove as rapidly as possible to the administration buildings, where they knew they would find Sir George.

A thousand and one questions crowded into their minds. Would the scientists have devised a method of harnessing the twins' telepathy? Had they yet built apparatus that could be put to the test? Would they be ready for the expedition in time? How were things progressing at the Lunar City spaceport, where the ship should be receiving its final touches? Chris couldn't drive the station wagon fast enough to satisfy his companions.

Tony led the way to the office bearing the label "Director." Unceremoniously they burst in, and there, sure enough, Sir George Benson sat at a paper-covered desk.

"Oh—er—hello!" he said, scarcely looking up from the report he was reading.

The astronauts and the girls looked at each other in astonishment. They had not expected any fuss when they arrived, but at least Sir George could give them a warmer greeting. Perhaps something of their thought communicated itself to the man at the desk, for suddenly he put down the paper he was reading.

"I'm sorry," Sir George apologized. "Do forgive me. That was a report that concerns all of you, and I'll tell you about it later. How are you all? Had a good flight? How's the training gone, girls?"

For the next ten minutes the director and his young friends chatted together. Then Chris could see that Sir George had something important to say. He decided to help.

"That report," he said. "You say it concerns us?"

"Indeed it does," the director said at once, obviously pleased to get down to business. "It's from the electronics team. They claim they've built some gadgets that will do the job. How soon will you be ready for us to test them?"

"Depends on the girls," Morrey told him.

"Oh, just give us an hour or so to unpack, have a wash, and get a bite to eat. Then we're all yours," Gail told him.

"I'll give you two hours," Benson answered with a grin. "I know what girls are when it comes to that wash and brush up. See you later."

Chris led the party to their old quarters and introduced the girls to Caleb. A room for the twins had been prepared in the next bungalow, but of course they elected to take all their meals together. Caleb promised some of his celebrated dishes.

Sir George Benson's allegation that girls can never be ready on time proved to be false. The young people were cluttering up the director's office long before the allotted period was over.

"All right! All right!" Sir George said defensively, "you win! Now I'll get Billy Gillanders to show you something special."

He spoke briefly into a phone, and a few minutes later Mr. Gillanders entered, followed by two men in white coats. Each carried what looked like a space helmet, but which was unlike any helmet the astronauts had ever seen. From the crown of each piece of headgear there hung what looked like a thick pigtail. Tony recognized it as a special type of electric cable.

"Our electronic fellows have come up with these," Benson explained. "One for Gail and one for Gill. The cables will be connected to black boxes of which they are very proud. All you have to do before being frozen is to put on these helmets. Oh, and I'm afraid you have to rub into your hair a special fluid which will aid the electrical contact between your skulls and the pads inside the helmets."

"Must we?" asked Gill.

"Either that or shave off your hair," Mr. Gillanders told her.

"We'll use the fluid," Gail announced quickly.

The test was an enormous success. After the girls adjusted the headgear, they were frozen in separate buildings. A radar scan, supposedly indicating an approaching meteor, was fed into the unconscious Gail. Gill reproduced it at once. Then current of a special pattern was passed into Gill's head, and now this was reproduced by Gail. In turn Gail's black box converted the signal into a command for activating some small rockets, which, on the actual space flight, would steer the ship away from the oncoming danger.

Sir George and his deputies were delighted. Nevertheless, they insisted on further tests, mainly with the mock-up cabin in the hangar. The extra couch had been installed, so that Gail and the astronauts could be frozen together. This was done a number of times, and the tests went without a hitch. One day Sir George gathered the six young people around him.

"Gill," he said, "you're staying with me. But tomorrow the rest of you can take the ferry to the Moon."

13

At Lunar City, the amazing place that had been constructed on Earth's satellite, all was ready for the space travelers. Their ship, Saturn 1, had been assembled in a vast cavern that had been excavated below the lunar surface. The spaceport, like the rest of Lunar City, was mainly below ground—just as the bulk of an iceberg is below the surface of the sea. This gave the dwellers on the Moon protection from the constant rain of meteorites—protection, too, from the fierce solar and cosmic radiation, and insulation from the extremes of temperature experienced during the lunar day and night.

By now Lunar City had grown so that it housed more than four hundred men and women. Most of the population was occupied with the preparation and launching of the ships and space probes that were constantly exploring the Solar System. The others were scientists manning the great observatory that was constantly scanning the far corners of the universe.

Commander Bickel himself welcomed the four young men and the girl. He personally showed them to the quarters where they would stay for the next few days awaiting the final preparation of their ship.

Chris and his three companions were impatient to see Saturn I, while Gail found the roomy underground living accommodation of great interest. The commander took the astronauts on a moving roadway along a tunnel leading to the launching hall. In the center, Saturn I stood proudly awaiting the finishing touches, its tall, silver shape towering toward the cavern roof. Over it swarmed the inevitable army of technicians —a scene very much like the final preparations for a terrestrial launch.

The last time Chris had visited Lunar City, the low gravity of Earth's satellite had been very obvious. Newcomers had found

conditions strange for everyone moved in kangaroo-like leaps. Now everyone wore padded suits containing plates of very heavy metal. At least it would have been heavy on Earth. But here it just made up a man's normal weight. Before the practice of wearing these weighted suits was adopted, people returning to Earth from a tour of duty on the Moon had a difficult time. Because only one sixth of the effort was required to do things under lunar gravity, muscles became flabby and weak. Back on Earth again, these former Moon dwellers found that their muscles had turned to water, and for a time they were unable to do anything but he helplessly in bed. The new weighted suits kept muscles in shape on the Moon and in condition to cope again with terrestrial gravity when required.

Commander Bickel took the astronauts to see their cabin. They, of course, were already familiar with every bit of it from their training experiments in the replica at Cape Kennedy. A fifth couch, they could see, had been added, and the commander told them ruefully what a panic they'd been in when Sir George Benson's command had reached them. However, all was now well, and the launching could go ahead as planned.

A quick check of the instruments convinced the astronauts of the accuracy with which the mock-up cabin had been constructed. Already they felt at home, as if they'd spent long hours in its confines. It was a joy to be preparing for another adventure into space—to be about to venture deeper into the Solar System than anyone had dared before. And it was exhilarating to know that they wouldn't have a long and boring voyage. Thanks to this amazing new technique of putting space crews into cold storage, it was as if someone had obligingly brought Saturn closer to Earth.

During this same period, Gail was being conducted over Lunar City by two women biologists. As she was shown the algae tanks and the hydrophonic forms, she kept up a running commentary to her distant sister. Although she had visited Earth's satellite before, Gail found much that was new and exciting.

* * *

The time for the launching of Saturn I was rapidly approaching. Commander Bickel was in almost constant communication with Sir George Benson, both by radio and by the more unusual method of the telepathic twins. Both on Earth and in Lunar City, tension was mounting as the final hour approached. Chris and his crew had been so thoroughly briefed that there was not much the director could add. It was a relief when the order came for them to don their space suits and to discard the weighted clothing that regulations required them to wear.

Commander Bickel himself supervised their last preparation. Gail, with the help of her biologist friends, shampooed her hair thoroughly with the strange liquid. Ugh! The girl thought, looking into the mirror. It's a good thing I'll be wearing that helmet. Without it I'd look mighty odd. Her sister, doing the same thing at Cape Kennedy, was expressing similar views. Still, they agreed, it was better than having their hair cut off.

The injections of antifreeze came next, and then the five were secured to their couches. Above each was a transparent cover awaiting the signal to descend on the figure below.

"Know something?" Morrey called to his companions as the last minutes ticked by. "This will be the first time we've been blasted off and not known anything about it."

It was true. The four young men and the girl would be frozen before the giant rocket lifted itself through the opened steel doors in the roof of the cavern. They wouldn't feel anything of the terrific thrust of the powerful chemical motor. They would have no part in the guidance of their ship. They would be just statues that wouldn't come to life for another nine months.

"Are you all right, Gail?" Chris Called across to the girl. "How's Gill?'

"She's ready, the same as we are," the girl answered brightly. Chris could detect the strain in the girl's voice.

The hatch was closed, and the five young people were shut off from the people outside. Now they could only lie and wait—

wait for the first descending movement of the covers, which would signal that the freezing process had begun. Would hypothermia be effective in the conditions of space? Would the automatic apparatus function properly, and would it defrost them when they reached their destination? If it didn't, then they might remain frozen forever, and the next few moments might well be their last as living human beings.

Chris was turning to look at his companions when Tony, his voice pitched a shade higher than usual, called out that the covers were moving. The leader looked up and confirmed that things were starting. In a few seconds the covers were in position, and the temperature had started to fall. Gail was trying desperately to keep in touch with her sister, and Gill confirmed that precisely the same thing was happening to her at the Cape. In a few seconds, or so it would seem, they would all wake up to witness perhaps the most wonderful sight in the universe—a close-up view of the planet Saturn and its amazing rings.

Back on Earth all was tense in the Cape Kennedy control. A voice, brought by radio from Lunar City, counted the last seconds before Saturn I was sent on its long, lonely journey into space. Only after the spaceship had been in flight for an hour would the Cape take over the operation. Meanwhile the men on the Moon were responsible for seeing the expedition safely on its way.

Sir George Benson and his three deputies, not responsible for the launching, wandered into the room where Gill Patrick had just begun her long sleep. A bank of instruments stretched almost all the way across the room a few yards behind the girl's head. The cable from her helmet carried her brain signals to the dials and screens that would convert them to meaningful information to the team of scientists who would maintain a constant vigil. Benson stood for a few minutes watching the steady tracings of the EEG. Nearly a quarter of a million miles away, another brain, not quite asleep, was responsible. For there was no doubt that the minds of the telepathic twins,

under the strange condition of hypothermia, were linked in tandem. Benson quivered at the thought that they might be on the threshold of a whole new science.

"Look!" Billy Gillanders called.

Billy, Professor Boronoff, and Dr. Rosenberg were watching one of the glass screens. On it a moving spot of light reproduced, much magnified, Gill's EEG tracing. Instead of being fairly steady with just a faint quiver, the spot was moving up and down by several inches.

"Saturn One is on its way," the director declared as he watched. He knew that, when the faraway spaceship came under the thrust of its powerful motors, a meter would send a tiny current through Gail's brain. And here, in a flash, the result already could be seen. This fantastic means of communication had come through its first test.

By starting the voyage from Lunar City, where gravity was only one sixth of what it was at Cape Kennedy, the ship was able to reach escape velocity with a much smaller consumption of fuel, thus leaving adequate reserves for later use. When a particularly heavy payload was essential for a large expedition, supplies of fuel and stores were accumulated. They were sent from the Cape to Lunar City in a number of freight ferries. A ship, launched from the Moon, could carry many times the load that its counterpart could from Earth. Saturn I, with its vast fuel tanks, would have been unable to lift itself through the dense terrestrial atmosphere. From Lunar City it rose gracefully into the surrounding vacuum.

Away in the velvet blackness of space Saturn I sped on with its human cargo. No longer could the astronauts be regarded as a crew. The still, cold bodies showed no trace of life—except, perhaps for the minute part of Gail's brain that was still awake. On this tiny cerebral activity the safety of the whole expedition might depend.

"Booster rocket away. Switched to ion drive," Commander Bickel radioed to Sir George.

"Good. Now it's up to us," the director replied.

Observations both from Lunar City and from the Cape confirmed that the huge ship was on a true course. Very little, if any, correction would have to be made. Perhaps some slight adjustment to the flight path might be necessary in a few weeks' time. For the present, all was well and the long vigil at Control had begun.

Week followed week. In that air-conditioned room in Florida Gill Patrick lay as if dead. Only the occasional quiver of the instruments connected to her head showed that she was still alive. Not for a single second was she alone. Always one or more scientists were watching the girl and the recorders. Always one of Sir George's deputies was in the building. The director himself was never far from a phone or radio.

Once Sir George flew to London to see the twins' parents and to report to them how their daughters were faring. He was able to say that the hypothermia was quite normal for both girls, that Gail in the speeding spaceship and Gill in the Cape Kennedy Control both seemed well. He invited the couple to go to the Cape to see Gill for themselves, but Mrs. Patrick declined, saying she preferred to think of the twins as though they were away on a long journey.

When Sir George returned to Cape Kennedy, he went at once to see the unconscious girl. Lying like a statue, she was just as she had been when he had left. A quick glance at the EEG revealed that telltale flicker saying that all was well. Mr. Gillanders reported that a slight change had been necessary in the ship's course, and this had been done by radio. Also that Saturn I had been struck by a micrometeorite, but that the automatic self-sealer had repaired the puncture.

Well satisfied, the director pored over the charts of the ship's progress. Under the gentle but persistent thrust of the ion motor, Saturn I was streaking along at over half a million miles an hour and still accelerating. Its course was remarkably close to the one chosen. Even if the ship's crew had been awake and active, the expedition could not have gone better.

Weeks turned into months. The intense interest first shown by the press, radio, and television in the Saturn expedition had

by now subsided. For the moment the five still figures so many miles away were forgotten by the world. A big scandal between two film stars had captured the world's attention. But this was not true at Cape Kennedy. The constant watch over Gill and her instruments was scrupulously maintained.

Now that the ship was so far away, there was an appreciable time lag in receiving radio signals from the automatic instruments aboard. The tracing from Gill's EEG revealed conditions more than an hour before the radio. As Saturn I approached the area where it would be in danger from the meteor shower, this telepathic signal was vital. Sir George himself spent long hours watching for any sign of the spaceship's peril.

It was just as the director was about to go off duty that the EEG began to oscillate violently. A shout from the scientist whose eyes were glued to the dancing spot of light recalled Sir George to his side.

There could be no doubt about it. This was the emergency they had all feared. It meant that Saturn I was on a collision course with one of the wandering meteors. From the amplitude of the oscillation it must be a pretty big one at that. Sir George Benson drew his breath in sharply. Now the crucial test of telepathic communication would come. Not only was his own reputation at stake for launching the expedition but also the lives of his five young friends. When he had decided to authorize the undertaking, Benson realized he was taking a risk. The next few moments would show whether or not he had been justified.

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"Send the signal to launch a lateral rocket," Sir George snapped.

The scientist was already at the apparatus which would send a small electric current through Gill's brain. If all went well, this would be reproduced instantly in the cerebrum of her sister. Apparatus in the spaceship would collect, interpret, and amplify this current, to ignite one of the rockets which would cause Saturn I to change course. A button was pressed, a current was fed through the helmet into the unconscious girl's head, and that was all that Control could do.

Unfortunately it had not been possible to design apparatus which would report back to Earth whether or not the lateral rocket had fired. If Control awaited the radio signal, it would be so long that it would be useless. By the time radio from Saturn I reached Earth, the spaceship would already be safe—or smashed to pieces. Only by watching to see if Gill's EEC continued to receive her sister's signal could Sir George tell whether the spaceship and its crew were still in existence. Not even aware that he was the center of a growing crowd of anxious scientists, Benson remained with his eyes glued to the apparatus.

A minute had gone by since the signal, sent via the twins, had been dispatched to the spaceship. By now Saturn I should have been pushed into a new course that would take it safely away from the menacing meteor. Every second that the tracing continued recording improved the chance that all had gone well. Sir George found himself holding his breath as the long seconds crawled past.

The second minute seemed endless, but at last it was over. Hope was rising rapidly, although as yet no one dared to voice it. How far away from the ship had that meteor been? Was the

danger over? If five minutes went by with the faint oscillation still showing, the director decided, it would be safe to assume that all was well.

A great sigh of relief went up from the men around the glass screen. The dot of light was still active—just what it should be if the unconscious twins were still in contact. So Gail, the other members of the crew, and the spaceship were still safe! Leaving Mr. Gillanders to keep vigil over Gill, Sir George went to the main control room to await the radio signals which would be on their way.

When they eventually arrived, the radio signals confirmed that for a few horrible seconds Saturn I had been on a collision course. The meteor had been as large as a double-decker bus, and the huge velocity of the spaceship had been closing the distance at a terrific speed. When the telepathic impulse had been flashed out from Control, the linkup had worked perfectly. A side rocket had roared into life, permitting the ship to elude the oncoming mass. Sir George felt almost weak with relief that this terrible danger had passed. The five occupants of the spaceship would, of course, be completely unaware of how near they had been to annihilation.

There were no more alarms on the journey. Although a close watch was kept on Gill and her instruments for every second of the day and night, there were no more frightening jumps of the EEG. The time was approaching when the crew in Saturn I and the girl in Control would be revived.

It was nine months since the six had been put to sleep—far longer than any humans had experienced hypothermia before. Would they be all right? Sir George's life seemed to consist of one crisis after another.

In Control, Gill was the center of interest. Dr. Morrison and his young assistant were standing by in case anything went wrong. The automatic apparatus that would defreeze the girl had been programmed in exactly the same way as that in Saturn I. As Gill was thawed out in Control, her sister and four

companions should be defreezing in the spaceship. If Gill's apparatus failed to work, the two doctors were at hand to do the job manually. There was no one standing by in Saturn I to do a similar service for Chris and the others if their equipment failed to work.

"Should be in the next half hour," Dr. Rosenberg, Sir George's American deputy, announced. Well, they could only watch and wait.

A dozen men were grouped around the couch on which the still form of Gill Patrick lay. For the better part of a year the girl had lain as motionless as a statue. If the equipment worked and Gill regained consciousness, it would be just as if a familiar piece of sculpture had suddenly come alive. Some of the waiting scientists had almost forgotten how her voice sounded, or how she talked and laughed.

A close observer might have seen a tiny vein throbbing in Sir George Benson's temple. It was the only sign of the terrible tension the director felt. If Gill came around according to the plan, it was reasonable to assume that the crew of the spaceship had also regained consciousness. However, they couldn't be 100 percent certain of this, for there was always the possibility of some faulty apparatus in Saturn I, even if here in Control it worked perfectly. Only when Gill was conscious again and in telepathic communication with her sister could Sir George be certain that all was well.

"How much longer?" Benson asked.

The director couldn't prevent himself from asking the question, even though he knew it was pointless and he already knew the answer.

"Nine minutes," someone volunteered.

For the hundredth time Sir George walked around the couch, peering intently at the complicated equipment that should soon be going into action. Then his eyes returned to the still figure of the young girl. If she failed to revive, he would be guilty of her death. And probably of the deaths of the spaceship's crew. He had promised to phone Mr. and Mrs. Patrick the moment their

daughters were conscious. What would he say if something went wrong?

Sir George paused in his restless pacing, for a slight click had come from the apparatus. A deadly silence suddenly descended on the roomful of men. All conversation stopped. All eyes were fixed on the couch in the center.

"It's working," the voice of Dr. Morrison shouted exultantly.

It was true. The automatic apparatus had come to life. A dial showed that the temperature of the sleeping girl was rising. Then came a faint flutter of pulse and a wisp of air was drawn into the lungs. Gill would soon be waking up.

Sir George silently thanked God that one, at least, of the young people would be safe and well. At his request, the room was vacated except for the two doctors, Mr. Gillanders, and himself.

The transparent cover had now been lifted, and the four men were bending over Gill anxiously. Her breathing was visible now and a warm flush had returned to her cheeks. At last her eyelids fluttered, and she opened them.

"Hello," she said, with an attempt at a smile. "Is—is it over?"

"Yes, it's over," Sir George said as he smiled encouragingly. "At least the first part is. How do you feel?"

"All right, of course," Gill answered, sitting up. "How should I feel?"

"I just wondered," the director replied with relief. "You've been asleep for nine months, you know."

"It's hard to believe," Gill said slowly. "It seems like only a few seconds. But Gail. What about Gail and the boys?"

"They should be waking up any time now," Sir George assured her. "Their apparatus was timed to operate at the same moment as yours. Let us know when you get anything from Gail."

"Of course!" Gill said. "Now can I take off this dreadful helmet?"

"I don't see why not," Dr. Morrison said. "Now that she's conscious, Gill's own brain waves are swamping those from her sister. Give her a hand, Sanders."

The young doctor jumped forward to help the girl, and in a few minutes the weird contraption, with its tangle of wires, was lifted clear.

"I'll bet I look a sight," Gill declared, shaking her head with relief.

"You look great," the young doctor told her. He would have said more but a severe glance from his senior colleague silenced him.

"Anything from Gail yet?" Sir George asked. It would be a great relief to know that the crew of the spaceship were awake.

"Not yet," Gill replied with a slight frown. She didn't like the loss of communication with her sister. As long as she could remember, they had been in almost constant touch with one another. To be unable to exchange thoughts made Gill a little uneasy.

"Never mind," Benson said cheerfully. "Actually your apparatus brought you around a minute or so early. Theirs in the ship might very well be a little late. Now I expect she'd like some food, Morrison."

"I'll take her to the restaurant," Dr. Sanders suggested eagerly, but Sir George smilingly refused.

"No. Gill had better eat here. I want to be on hand when anything comes through."

An appetizing meal was brought in on a tray. So as not to embarrass Gill by watching her eat, the others had some coffee, although Sir George wanted only one thing then a sign that all was well aboard Saturn I. While she ate, Gill chatted with her companions. They told her what had happened in the world while she had been asleep. Halfway through the meal, a telephone rang, and Sir George indicated that the girl should take the call.

"Mom!" Gill burst out, as she heard the voice on the other

end of the line. “Yes, I’m fine. How are you? How’s Dad?”

Mother and daughter exchanged greetings and news, while the four men in the room pretended not to listen and spoke quietly together. The keen ear of Sir George heard Gill say that she hadn’t heard anything from Gail yet, although she expected to at any moment. Yes, she would get Sir George to notify them as soon as there was some news.

The girl finished her meal soberly. Surely the equipment in Saturn I should have functioned by now. In spite of a brave show of unconcern, Gill was more than a little worried at the lack of communication from her twin. Gail must still be frozen —if she was still alive! Gill felt a sharp pang as this horrible doubt flashed into her mind. Then she dismissed it, for hadn’t Sir George said that they were getting the EEG wave from Gail up to the time she became conscious. Perhaps she ought to volunteer for another spell of hypothermia just to see if Gail was all right.

Gill was about to make the suggestion to Sir George when she could have shouted for sheer joy. Gail was chattering away inside her head, asking if they had both been defrosted or whether they hadn’t yet been put to sleep.

The director and his colleagues saw Gill’s changed expression with infinite relief. They guessed that her twin had come through, and that everything, so far, must be well aboard Saturn I. Sir George allowed the sisters to chat together for a few minutes before breaking in with a request for information.

The cover was up, so it must be over. Chris once more experienced the astonishment he felt every time he had hypothermia. Time, from the moment he’d first settled on the couch till now, seemed continuous. It seemed only a minute or so ago that he and his crew had been awaiting the launch. If the nine months were over, they must be near Saturn. That meant there was so much—so very much—to do.

“Everyone awake?” Chris called to his companions, as he began to unfasten himself.

They all replied except Gail, for the transparent cover was still clamped down over the girl, and she lay as still as a carving in marble. As soon as he was free, Chris hurried to Gail's couch, to be joined by the others who looked on anxiously.

"Why are we awake and not Gail?" Morrey demanded.

"We each have a separate automatic apparatus," Chris pointed out. "Gail's may be timed to operate a little later."

"But why should it be?" Morrey persisted. "Are you sure there's nothing wrong?"

"There wasn't anything wrong with ours," Chris argued. Still, he'd be relieved to see the girl wake up.

"Tony, keep your eyes on Gail. Morrey and Serge, don't you think we'd better say hello to Saturn?"

In their anxiety about the girl, the astronauts had forgotten for a moment that, after nine months of travel, their ship should be close to the planet for which it was named. The whole object of the expedition was to observe this fantastic planet with its marvelous rings. While the mechanic maintained a watch on Gail, the other three hurried to the portholes to peer out.

They were not disappointed. The vast planet seemed just outside their ship. They could see the great patches of gray, brown, and pink. These were the clouds of gases that formed the outer layers of the planet's atmosphere. Even as they watched, they could see the colored patches changing in shape as if rent by great storms. Occasionally they saw a flash of light from the depths of the clouds. Maybe it was lightning caused by the perpetual tempests, Chris thought. The astronaut of the future who penetrated that monstrous turmoil would have to be a very brave man.

But it was Saturn's rings that looked the most spectacular. The ship was still half a million miles from the planet, and the rings could be seen in their full glory. Even at this distance it seemed possible that the theory of the rings consisting of vast numbers of small pieces was correct. Each ring seemed to be myriad points of light, each a tiny moon hurtling around Saturn

and reflecting the light of the Sun.

Because the moonlets were so numerous, the rings would look continuous to a terrestrial observer. Here, so much nearer, Saturn appeared to be wearing a multiple crown of diamond dust.

The diamond dust was the most dense in Ring B, the brightest of the planet's adornments, when seen from Earth. If this was the debris from a broken moon, then it must have been a large one. The outer ring, though bright, hadn't so many moonlets as its companion, while the Crepe Ring had fewer still. Astronomers had supposed that the luminosity of each of the rings was in proportion to the density of its moonlets. Here was firsthand proof that they were right.

"Look at the Cassini Division," Serge called. "It isn't empty at all."

What the Russian said was true. Although this gap between Rings A and B seemed clear from Earth, they could now see that it had quite a fair sprinkling of points of light. It was as if some of the moonlets were deserting Ring B, crossing the gap, and becoming part of the outer ring. Or perhaps the other way around.

There was a lot for the crew to do. Their reports would be fascinating, for they would be able to clear up many of the mysteries that had puzzled astronomers for centuries. With growing excitement, the crew tore themselves away from the entrancing sight outside.

"Chris, come: here!" It was Tony who had called him. In looking at the spectacular view of Saturn, Chris had for the moment forgotten the unconscious girl. Now he hurried over to see why the mechanic had summoned him.

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"Its started," Tony informed his leader.

To Chris's great relief, the mechanism controlling Gail's hypothermia had swung into action. For some reason it was almost an hour behind those of the other crew members. However, there was no time to speculate on the cause, for already the cover had lifted, and the girl would soon be awake. It would be important to let Control know of this situation. Gail would be a great help, for the radio message he had sent half an hour before would still be on it way to Earth.

When she opened her eyes, Gail Patrick saw four delighted young men around her couch. She was just about to greet them when her sister's thought flashed into her mind. Chris and his companions could see there was a rapid exchange between the twins. They would no longer have to worry about letting Control know they were all conscious. Long before the radio waves could convey the message, the Patrick twins would have told Sir George the good news.

"Gill was getting worried because my machine hadn't worked," Gail called out some time later as she freed herself and went to join the other members of the crew.

Chris, Serge, and Morrey were frantically busy making observations of Saturn and the rings. As the ship sped nearer to the giant planet, it was of vital importance to measure the distance between them accurately. Control would then be able to decide on the most suitable orbit. The information was passed to Gail and Tony, who sent it back to Earth by telepathy and radio. Not until Control had received all the data Sir George required was there any rest for the crew. Then, while the orbit and the necessary maneuvers were being worked out by the big computer, the astronauts were able to send personal messages through the twins. It was after a mutual exchange of greetings

with many friends on Earth that Gail's face suddenly took on a startled look.

"Gosh, what happened?" she asked aloud, and her friends in Saturn I knew that the question was really addressed to her sister eight hundred million miles away. They waited anxiously for the answer.

Gail swallowed hard.

"Do you know, Chris, that we were nearly smashed by one of the wandering meteors? Gill's been told that what Sir George feared actually happened. We were on a collision course, but it seems that Gill and I, even in our unconscious state, helped to steer the ship to safety."

The astronauts experienced a queasy feeling at the news of their narrow escape. Had disaster come, they would never have known it. To be told that, but for the twins' strange power, they would have been destroyed came as a shock. It seemed incredible that Control had been warned and the ship's course altered through the telepathic power possessed by Gail and Gill.

"I suppose all we can say is thank you," Chris said to the girl rather lamely.

"Don't thank me," Gail answered briskly. "I was just a passive instrument."

"Still—without you we wouldn't be here," Morrey insisted gallantly.

"Wait a moment," the girl said suddenly. "I need a notebook and pencil."

Her companions knew that she was about to receive their instructions through her sister. What a useful method of communication this was, Chris thought. The maneuvers to put Saturn I into orbit would be completed long before a radio message could arrive. No doubt the radio communication would bring confirmation and perhaps more detailed orders, but the twins' message would be the basis for immediate action.

"There you are," Gail said, after writing furiously for a time. "Does that make sense?"

Chris, Morrey, and Serge studied what the girl had written. Yes, undoubtedly these notations were their orders for turning the ship into an orbit. They were clear and precise. Now they could prepare to take a closer look at the planet and its rings. So great was Chris's confidence in the ability of the twins that he did not wait for radio confirmation. Quietly and efficiently the four male members of the crew went about their duties, while the girl kept up a running commentary to her distant twin.

"That should do it," Chris said at last. They had carefully carried out the instructions of Control as brought to them by Gail. Saturn I was turning in a great are about the planet. Soon, under the influence of the strong gravity, it would swing into orbit some seventy thousand miles from Saturn's surface.

"Because the rings lie in the same plane as the equator, Control is putting us in a polar orbit," Chris explained to Gail. "That means we shall move at right angles to them. We shall see them at the full and also from the edge position."

"How close shall we be?" the girl asked.

"Don't worry," Morrey assured her. "We'll be a good thirty thousand miles from the outer edge of Ring A. Not much risk of bumping into stray bits of the ring."

"We could collide with Mimas, the innermost of Saturn's nine moons," Serge pointed out. "Its orbit is about the same distance from the planet as we shall be."

"Yes, but as it is in an equatorial orbit and we will be in a polar orbit, it's many millions to one against our coming very close," Chris explained.

"How long will it take for one orbit?" Tony asked.

"About twenty-two and a half hours," Chris told him. "So we shall have time to make between three and four orbits before we have to return."

"Chris!" Tony called out suddenly. "May I ask you something?"

"Certainly," the leader answered in surprise. "What is it?"

"Can we have something to eat?"

* * *

At Control Sir George Benson was humming quietly to himself. It wasn't very often that the director indulged in this musical exercise, but he was feeling good. Everything connected with the Saturn expedition was going well. Apart from that heart-stopping incident when it seemed that the ship would collide with the meteor, all had gone like clockwork. The hypothermia had been a wonderful success, and this new method of using telepathy had more than justified itself.

Messages from Chris Godfrey and his crew indicated that they had begun turning the ship into the desired polar orbit. From this vantage point they would be able to scan the majority of the planet's surface and to see rings from all angles. They would be able to examine at close range a phenomenon that occurred nowhere else in the Solar System—or, as far as Sir George knew, anywhere else in the Universe. The crew's photographs would be fascinating, although he would have to wait nine months before he could see them. Television transmission from such a distance was impracticable. He would have to await the arrival of the actual film record that the crew would bring back.

When Mr. Gillanders approached his chief, he was greeted affably. Though Billy and Sir George had been close friends for many years, the director was likely to be very abrupt when he was worried about a mission. The.fact that he seemed happy and relaxed indicated to the Australian that Sir George was delighted with the Saturn venture so far. Billy Gillanders prayed that nothing would go wrong for his friends out in the spaceship. He was always worried when things seemed to be going too well.

Automatically, Mr. Gillanders glanced at the many recording instruments in Control. As he wandered down the room, he had a word with most of the men on duty. Every reading seemed normal; every feature of Saturn I's flight seemed perfect. Except one.

For some reason he couldn't explain, the big Australian scientist paused longer than usual in front of one instrument.

This was the apparatus which monitored the ship's distance from the planet's surface. Saturn I was constantly beaming a radio pulse at the surface, and the echo was radioed back to the Cape. The recorder, in front of which Mr. Gillanders had paused, was registering the distance on a chart. Across the chart had been drawn a red line based on results from the computer. The black line of the recording pen should follow the red line closely. If not, there would be trouble.

The black line had crossed the red one several times. Then it had swung back again to the desired position. As he watched: the chart, Mr. Gillanders waited for the moving black line to rejoin its red companion after its latest departure. It seemed in no hurry to do so. A quick check on previous aberrations showed that they had lasted no longer than ninety seconds. Already this divergence had been going on for nearly three minutes! He didn't like this.

The deputy director considered whether he should call his chief's attention to the erring line. Saturn I was not keeping to the exact path chosen for it, but as yet the divergence was not too serious. If it increased to any marked extent, remedial action would have to be taken. He decided to report to Sir George if the black line was still misbehaving when he'd finished his tour of the room.

Both at the Cape and in the ship the girls were having 2 rest. It was best for the two of them to do this at the same time; otherwise the thoughts of one would come pouring it and keep the other awake. Sir George told the twins to take a spell off duty, for he did not want to tire them unduly. He knew that at any time an emergency message might have to be flashed from one to the other. When Mr. Gillanders came to tell him about the unsatisfactory reading of the altimeter, the director hesitated before arousing Gill.

"Let's have a look at it," he said to Billy, and the two men made their way to the instrument that was causing concern.

Some of the men, aware that all was not well, were already gathered around the recorder.

"I don't like it," Benson muttered after he'd studied the tracing for a few seconds. "The divergence is increasing. This time the line hasn't returned to its correct position."

"And this is how the ship's path was more than an hour ago," Mr. Gillanders reminded him.

"Thank you. I know," Sir George said sharply. The good humor of a few minutes before had vanished. His deputy and the other scientists could see that Benson was worried.

"I'll have to get the girls to give me the present position," Sir George announced, as he hurried toward the room where Gill was sleeping.

"Gill," Sir George said, gently shaking the girl. "I want you to get in touch with Gail."

The girl awoke and rubbed her eyes.

"What is it, Sir George?" she asked. "Is anything the matter?"

"Nothing to worry about," the director said, for he knew that the girl would communicate her fears to Gail, and he didn't want to alarm the crew.

"Ask Gail for the reading of their altimeter," he said. "I want the latest figure."

In Saturn I Tony, Morrey, and Gail were resting. The girl seemed to be asleep, but the two young men found it hard to relax. Outside their ship was one of the glories of the universe, the most fabulous sight in the Solar System. The beauty of the planet and its rings had greatly affected them. They felt a compulsion to stare, so completely were they fascinated by the spectacle.

Gail stirred in her sleep and then sat up, for the safety belts were arranged to allow this. Chris turned from his work as he saw her move, for he guessed that she had been aroused by Control. He waited curiously for what the girl would say.

"Chris, Sir George wants the altimeter reading," Gail told him.

The astronaut was startled. Why had the director broken into the girls' rest period for this routine piece of information? The monitor at Control would give him this data constantly, even though it would be an hour behind. Was it just to see if the crew was on its toes? He went over to the instrument and studied its reading.

"Seventy-nine thousand," he called out to Gail, and she flashed the figure to her sister. Chris resumed his observations, and the twins had a little chat before resuming their rest.

How could Chris know that in the long, curving run into a polar orbit he should have been eighty thousand miles away from the planet at that moment? Only the great computer at Control could work out the correct path, and he was content to leave this to Uncle George and his colleagues. As far as he was concerned, everything was going well. He was looking forward with keen anticipation to seeing those rings from all positions.

"Seventy-nine thousand!" whistled the director. He was careful not to show his surprise and dismay to the Patrick girl. Any alarm she felt would be transferred instantly to the crew, and he didn't want that. At least not yet.

A hasty conference was called, and Sir George explained the position to his deputies.

"The ship should be here," he told them, pointing to a spot on the red line. "Instead, according to a telepathic transmission, it's here."

He indicated a point ahead of the moving black line that was well away from the ship's theoretical position.

"We can correct this, of course," he went on, "but why is it happening?"

There was a buzz of conversation among the scientists. No one questioned the path worked out by the computer. There were far too many built-in checks for the machine to give a wrong answer. If the ship was deviating from its correct course, then an unknown factor must be present. There must be

something missing from the data fed into the machine—something which was altering the course of Saturn I and which hadn't been anticipated.

"We can't be wrong about the planet's gravity or magnetic field," Dr. Rosenberg said. "We've checked them too often to make an error."

"Yet it does seem that some force is pulling the ship into the planet," Mr. Gillanders pointed out. "If it isn't gravity, what is it?"

Professor Boronoff, the Russian, had removed his glasses and was polishing them excitedly.

"The rings," he called out. "It must be the rings. There must be a considerable amount of matter in them—maybe more than in the planet itself."

Sir George looked at his colleague keenly. Instinctively he knew that the Russian had hit on the answer. Of course! It could only be the rings! The attraction of their mass wasn't as negligible as had been anticipated. It must be quite strong to affect the spaceship as much as it seemed to be doing.

"Make a fresh calculation," the director snapped. "Feed in the ship's deviation and assume that Boronoff is right. The sooner we get Saturn I onto a new course, the better."

Tight-lipped and tense, the scientists scanned their instruments, prepared the data, and fed it into the electronic machine. Though it took only a short time, Sir George was impatient.

"Has the machine stopped working?" he grumbled.

Even as he spoke, the computer began to clatter out its answer, and the director, with his colleagues looking over his shoulders, studied it intently.

16

"Come and look," Chris called quietly to his companions. He had no desire to awaken Gail, who seemed to be napping. Morrey, Serge, and Tony took turns gazing through the observation window.

The sight was enthralling. Saturn, in all its majesty, was like a vast pearl, its surface of pinks, blues, and grays constantly changing. Even from this distance it was possible to appreciate the fantastic winds that must be churning the upper atmosphere. The constant movement and change in color was caused by the perpetual storms that raged forever about this monster of the skies. Now the lightning flashes from deep down in the turbulent atmosphere could be seen more plainly. Chris marveled at the vast amounts of electric energy that were being generated and discharged.

But it was the rings that held the astronauts' attention even more than the fascinating planet. If Saturn was the scene of perpetual change and turmoil, the rings were a picture of utter serenity. The myriad points of light that formed the planet's many-layered crown shone with a stillness that contrasted sharply with Saturn's troubled face. As the spaceship sped on its course, the planet seemed to be turning slowly so that the rings, glittering like thickly spread diamond dust, were opening up more and more.

Now the crew could see, in addition to the wide Cassini Division, several smaller gaps in each of the two outer rings. Even the darker Crepe Ring seemed to be divided in the center. Some of the divisions were so narrow that they never could have been observed by terrestrial telescopes. Even the instruments at Lunar City had failed to pick up all the features that the astronauts were now able to see. With the automatic camera steadily recording this new information, Chris and his

friends could only stare and marvel.

"Chris," the voice of Gail called out suddenly, "we are to alter course."

The crew turned in surprise toward the girl whom they had thought to be asleep. Why should they have to alter course? Had Sir George made a change in their plans?

"What is it, Gail?" Chris asked. "Must we break orbit?"

"I don't know," the girl confessed. "Gill says those are Sir George's orders, and he wants them carried out at once."

"Very well, then," the young man said with a sigh. "Fire away, and Morrey will make a note of it."

The girl slowly repeated the instructions she was getting from her sister. Morrey's pencil scribbled away as she spoke. Long before the message was over, Chris realized that it meant a sharp change in their course. When Gail had finished, he read the notes through carefully. Then he turned to the girl.

"Ask Sir George what's happened. What's the reason for the change?" he snapped.

Tony, Serge, and Morrey were reading the instructions in glum silence. Then Gail spoke.

"Sir George says to make the change immediately. He'll explain later."

With a shrug, Chris gave the sign to his companions that the lateral rockets mentioned in their orders should be fired for the prescribed periods. He hoped Uncle George had good and sufficient reason for this diversion when all had seemed to be going so well. He watched his crew prepare to change the ship's course.

"Chris," the voice of Serge called out in alarm, "K-three is out!"

What the Russian meant was that lateral rocket number K-3 had failed to function. When he pressed the firing button of that number, a small red light should have indicated successful ignition. Again and again Serge pressed the button, but the

indicator light remained stubbornly absent.

Chris hurried across to his companion and looked anxiously at the recalcitrant button.

"Tony," he snapped to the mechanic. But Tony was already on his way to investigate the cause of the trouble.

"Report this to Control," Chris ordered Gail.

Back at Cape Kennedy there was great concern when Chris's message came through. It was absolutely necessary to alter the spaceship's course before it passed over the edge of the rings. In that position, although the rings would be almost invisible to the astronauts, they would be exerting the maximum attraction on Saturn I. Unless the flight path could be corrected, every time the spaceship flew over the rings, it would be drawn nearer to them. Eventually the ship's path would pass through the outer ring, and when this happened, it would immediately be destroyed by the innumerable meteorites that formed the planet's adornment.

"Listen carefully, Gill," Sir George said seriously. "Tell Chris to work on K-three as quickly as possible. Meanwhile he is to report his altitude constantly. I want to know as soon as they have discovered the cause of the switch failure.

"Very well, Sir George," the girl answered quietly, and she concentrated on getting the message through to Gail. Although she didn't understand what was happening, Gill could sense the mounting air of crisis. Was the safety of Saturn I and its crew in danger? Sir George hadn't said so, but the failure of the lateral rocket must be serious, otherwise there wouldn't be the tremendous activity that was now going on in Control.

"We must have an answer to every possible variant of the situation," the director barked to his colleagues, and the computer staff shuddered a little at the thought of what this involved. Already, a long and detailed assessment of their position was on its way by radio to the spaceship. It was Sir George's explanation of how the unexpected pull from the rings had drawn the ship much closer to the planet than had been

anticipated. The burst from K-3 had been ordered to correct this. Unless the firing switch could be quickly repaired, other maneuvers would have to be tried. There was, as yet, no cause for alarm.

As he added the last statement, Sir George hoped with all his heart that this was true. He fully appreciated the need to maintain the crew's morale, even though he didn't doubt their courage when faced with danger. The computer should come up with several useful alternatives, but any appreciable delay would make things more difficult.

In the distant spaceship, so far away, Tony had now become the most important member of the crew. The others could only stand by and look with wonder at their friends wonderful skill with tools. First he examined the firing button itself, took it apart, discovered nothing wrong, and reassembled it. Then, piece by piece, he removed sections of the cabin wall to expose the complicated wiring that lay beneath them. A quick examination failed to reveal any break.

"I'll have to check every wire," he grunted.

"How long will that take?" Chris asked.

"Hours," Tony answered laconically.

Chris pursed his lips and turned to the altimeter.

"Report a distance of seventy-seven thousand, five hundred," he said to Gail, "and tell them we don't know how long the repair job will take."

There was little that the others could do to assist Tony. Occasionally he called for a tool or for someone to hold the end of a wire. He was systematically tracing the fault in the firing arrangement, which he now believed was a broken cable. Even though every part of a spaceship was thoroughly tested before each launching, the strains and stresses of flight and the risk from micrometeorites still caused occasional failures. But it was not often that a fault occurred in such an important component at such a critical time.

When the radio report from Control began coming through, Chris, Morrey, and Serge listened with grave faces. Because no probe had ever before been sent to Saturn, there was little wonder that the gravitational pull of the rings had never been appreciated. Indeed the very nature of the rings had been a source of considerable speculation. Now it was confirmed that they were densely packed regions of fragments of former moons, and that the total amount of matter in them was at least equal to that in the planet itself. Each time the ship passed over the edge of the rings, it would be subject to the full gravitational pull of the planet and rings together. If only Tony could get that wretched lateral rocket to fire! But what would happen if he failed?

Chris looked through the observation window again. Saturn I had passed over the north pole of the planet and was now racing back toward the rings once more. He had observed the rings in their full width and glory as they could never be seen from Earth. But now there seemed to be something sinister about them. They were like those beautiful exotic flowers that attract and then trap unsuspecting insects and small animals. What would happen if the ship's course had not been altered by the time they passed over their edge again?

They could, of course, always start the main motor and break orbit. In any case that's what they would have to do to return to Earth. Once orbit had been broken, Chris doubted whether they would have enough fuel to make another attempt to circle Saturn. So long as there was a chance that their course could be corrected by means of the laterals, he would wait. Only if the expedition was faced with disaster would he ask Control for permission to end it.

When Chris took another reading from the altimeter for transmission to Control, he found that they had dropped another five hundred miles.

"Seventy-seven thousand," he called out to Gail.

He might not have thought this figure too alarming if he hadn't heard about the effects of the rings. Actually they were about the distance from Saturn that had been originally

planned and about the same as the inner moon Mimas—although, of course, the little satellite was on an equatorial orbit. The crucial time would come about seven hours later when they were due to make the next pass over the rings.

By this time Tony had stripped away a fair amount of the cabins inner casing. To Gail, who could only watch unhappily, it seemed as if he were taking the whole ship apart.

"And that's exactly what I'll do if I can't find what's wrong," Tony growled.

Although it was no fault of his, the mechanic felt that any part of the ship that functioned poorly was a reflection on him. At the moment this bothered him more than the danger they were in. Stubbornly he went on with his task, hour after hour, but still the defect eluded him.

"Come and have a break, Tony. That's an order," Chris insisted some time later.

The mechanic stretched his aching back.

"But what about this blasted rocket? I'd rather continue till I've patched it up."

"Nonsense," Chris said. "A few minutes won't make any difference. We're still seventy-three thousand miles up. That means at least twenty-six thousand miles beyond the outer edge of the rings."

"Maybe," muttered Tony, as he stretched himself, "but we're much closer than we should be, aren't we?"

"No sign of the repair yet?" Sir George asked Gill. The girl shook her head.

"Gail says Tony has taken half the cabin apart," she told the director, "but he still hasn't found it."

Sir George glanced at the chart on which the ship's altitude was recorded. Ahead of the black line that was coming by radio were points representing the positions called out by Gill. It was remarkable to see how, about an hour later, the black line

would move through Gill's dots.

"The fall in altitude is fairly steady," Sir George observed to Mr. Gillanders, "but we must expect quite a sharp dip when the ship is over the rings."

"Are you going to try any of the alternative operations?" the Australian asked. He was referring to the additional maneuvers worked out by the computer, which would be substituted at certain specified times.

"I'm naturally reluctant to break up the expedition," Sir George answered thoughtfully. "Of course a great deal depends on the precise effects of the rings when the ship passes over them. Until we can measure this no final decision can be made."

"Couldn't you order one of the other lateral rockets to be fired?" Billy asked.

"I could, but as you know that would put the ship into a non-polar orbit, which wouldn't be so good for observations," Benson told him. "Then there's an even more important reason. The gravity of the rings will have the least effect on the ship if it crosses them at right angles as it should on its present course. If the ship passes the rings at a smaller angle, the effect will be much greater."

"So you're going to wait and see what happens at the next crossing?"

"Yes—unless they can get K-three to work before then. What's the latest news, Gill?"

"No luck, yet," the girl answered. "Tony thinks he may have to go outside."

"Hm! I hope not," Sir George declared. "It hasn't been planned for any of the astronauts to venture outside their ship. Only limited supplies of oxygen are available for the space suits."

"He may have to," Billy Gillanders pointed out. "If the damage is caused by meteoric penetration, it can be detected most easily from outside. I don't suppose Tony would be out of the ship for more than a minute or two."

Any further speculation was interrupted by a long report from Chris coming over the radio. He detailed the steps Tony was taking to trace the fault and asked Control if they had any suggestions. He followed this with a string of readings from all the instruments in the cabin so that Control should have an exact picture of the situation. One thing that was noticeable was the increased velocity of the spaceship. This was not surprising because of the lower altitude. It meant, however, that the ship would be passing over the rings that much sooner.

Sir George paced up and down the room thoughtfully. Should he put an end to the whole undertaking and order the crew to return? If it was going to be difficult to steer the ship, he'd terminate the expedition rather than risk the lives of the astronauts. Already a vast amount of scientific information had been received, and there would be much more stored up in the ship's recorders. If he recalled Saturn I now, he could say that the undertaking had been at least 60 percent successful. Was it worth hazarding the lives of Chris—and his men for the other 40 percent?

So many times in the past Benson had had to make difficult decisions. Always his guiding principle had been to gain as much knowledge as was consistent with the safety of his crew. On only one occasion that he could remember had he deliberately decided to sacrifice Chris and his friends. But that is another story. No. He'd recall the ship if the fault hadn't been corrected after the next passage over the rings.

"When will that be?" the director asked Mr. Gillanders, having told him of his decision.

"Because of the ship's increased velocity, it will be in about an hour," the Australian replied.

"Very well. Everyone stand by. Gill, I want a report every two minutes. You can tell Chris that if the fault isn't repaired in the next seventy-five minutes, he'll have to break orbit and prepare to return," Sir George said briskly.

The girl nodded and sent the instructions flashing to her sister.

17

Chris pursed his lips as Gail gave him the message from Sir George. What a terrible thing it would be if they had to terminate their expedition prematurely! There was so much to learn about this fascinating planet and its attractive adornment. Chris permitted himself a grim smile. "Attractive" seemed to be just the right word to describe the rings.

"Nothing inside here," Tony muttered. "I'll have to go outside."

The mechanic had failed to trace the fault that was stopping K-3 from igniting. He had checked all the wiring inside the cabin, and now the only thing left was to put on a space suit and see if he could spot the damage to the lateral rocket from outside the ship.

"Can you put these sections back?" Tony asked the others, anxious not to waste the time himself on this routine job.

"We'll do it," Morrey assured him, and while Chris assisted Tony into his space suit, Morrey and Serge began to replace the bits and pieces that the mechanic had removed. Gail kept relaying information to her sister, so Sir George knew exactly what was happening.

In a remarkably short time Tony was ready. Chris clamped down the mechanic's helmet, and they tested the radio. Then Tony clipped the nylon safety line to his belt, together with a bag of tools and the jet gun with which he would propel himself about when outside the ship.

"Don't stay out too long," Chris advised. "If you find it's a big job, well let Control know."

"What could they do?" they heard Tony grunt over his radio. He stepped into the air lock, and Chris closed and clamped the door.

“All set,” the voice of Tony said. “Safety line clipped on. I’m about to open the hatch and step outside.”

A red light appeared over the air-lock door, indicating that Tony had indeed opened the outer door and was about to step into space.

“Gosh! It looks great!” he told those inside.

The black velvet of space was sprinkled with countless points of light, each shining far more brilliantly than stars seen from Earth. But Tony’s gaze was captured by the brilliant giant planet, which seemed to be turning slowly beneath him. It required a considerable effort for the mechanic to tear his attention away from Saturn’s hypnotic spell. His job was to examine the lateral rockets from outside to see if he could locate the defect in K-3. Even as he loosed a short blast from his jet gun to propel him along the side of the ship, Tony’s eyes wandered back to the planet and its rings, which were now almost in edge-on position.

With the help of the safety line and several more squirts from his gun, Tony found the position of the faulty rocket. Its number was still marked plainly enough, even though the white lettering had been scratched by countless particles of cosmic dust during the long journey from Earth. As Tony had feared, the orifice of the small rocket was scarred and bent, showing plainly that at some time it had been struck by a meteorite. This would mean that he’d have to remove the lateral rocket completely and replace it with one of the spares that the ship carried. Because of the fusing caused by the impact of the meteorite, the job wasn’t going to be an easy one. He reported his discovery to Chris.

“How long will it take?” the leader asked over the radio. “I must let Control know.”

“Anywhere from six and ten hours,” Tony replied. “It’s not going to be an easy job.”

“All right. Come inside, and we’ll see what the Cape has to say.”

Tony was about to propel himself toward the door of the air

look when a strange thing happened. His nylon safety line which had been floating about in the usual weightless condition, suddenly became tight. He found himself hanging from the end of it well away from the ship. At the same time he heard a cry over the radio from Chris.

"What's the matter, Chris? What's happened?" Tony called in some alarm.

"We must have entered the gravity field of those rings," Tony heard his friend say. "Are you all right?"

Tony explained about his safety cord, and Chris repeated his instructions to come aboard at once—this time the mechanic heard a note of urgency in his voice. Pulling on his safety cord, Tony hauled himself to the side of the ship and grasped the handle of the air-lock door. In a few seconds he had swung it open and clambered inside. Shutting the outer door, he gave the signal to his friends that he was inside. Soon a green light indicated that the pressure on each side of the inner door was equal, and he stepped into the cabin. With the help of Serge, he soon had his helmet removed.

"What happened, Chris?"

"Just that the gravity field of the rings must be strongest when passing over their edge. We felt quite a kick on entering it. Like the rings themselves, the gravity field must be unique, because we entered it so suddenly," Chris explained.

"We must be dropping toward the planet rather fast," Morrey ventured. "What's our altimeter now?"

"Sixty—one thousand," Serge exclaimed after looking at the altimeter.

"Gosh, that's only fifteen thousand above the rings," Morrey burst out.

"Gail, give Sir George this message," Chris said, and explained the change in the ship's course. This was followed by a series of readings giving the altitude, velocity, and direction of Saturn 1. Now it was up to Control to tell them the next move.

* * *

Sir George's face paled as the significance of Gill's words struck him. Mr. Gillanders and Dr. Rosenberg exchanged glances. Professor Boronoff polished his glasses furiously. The four men moved out of earshot of the girl.

"There's no time to replace K-three," Sir George said in a low voice. "They'll pass right through Ring A next time."

There was a chilled silence among the scientists, for though the rings were very thin, they were so full of matter that it could only mean disaster to the ship and crew. There wasn't a chance in a million that Saturn I could pass through the ring unscathed. There was only one thing to do, and they all knew this without waiting for advice from the computer. Chris must start up the main motor and break orbit!

So the Saturn expedition must come to an end! Because of the unforeseen effect of the rings' gravity, Man's deepest probe into space would be terminated prematurely. It was not a decision Sir George wanted to make, but he refused to subject the four young men and the girl to any further risk.

"Tell Chris to start the motor and break orbit," he said shortly to Gill.

The girl looked at the scientist with large, startled eyes. There must be something seriously wrong if Sir George was ordering the ship back to Earth. She saw his pale, troubled face and the grave faces of the other men.

"Gail," she flashed to her sister, "I don't know what's happened, but Sir George wants Chris to start the motor and break orbit."

"But Tony's just gone outside again to repair the side rocket," Gail's thought came back. "I'll give Chris the message.

"Sir George," Gill said, "Gail tells me Tony has just left the ship to have another go at K-three."

"Tell Chris to get him back inside and to break orbit immediately," the director snapped.

At the speed at which Saturn I was traveling, Sir George knew that the crew hadn't any time to lose. The ship was

spiraling rapidly toward the planet. Only the kick of the powerful motor could wrench it from destruction. And it would be too late unless it was done in the next forty minutes! Why had the young fathead left the ship again? Sir George wondered irritably.

"Come back inside, Tony," Chris' called out over the radio, and the mechanic heard the words plainly as he scrambled over the ship's casing.

He didn't reply. Neither did he attempt to obey his leader's order. Instead he made his way carefully to a yawning hole he'd spotted in the casing just as he was about to tackle the faulty rocket. As he examined the gash in the outer skin of their ship, he knew that the position was very serious. A meteorite must have struck a glancing blow some time during their long voyage from Earth. Because of the angle of impact, it had traveled along the wall of Saturn I and had burned away the metal sheet. The vulnerable inner skin of the ship was exposed and any further encounter with a meteor would puncture the oxygen tank which lay just beneath. It was essential that the outer casing should be patched without a moment's delay.

"Chris," Tony reported back, "I've found external damage close to the oxygen tank. I must patch it right away. It won't take long."

The leader was in a quandary. Sir George's order for Tony to come inside had been very definite. On the other hand the mechanic could see at firsthand the danger the ship was in. If they were un-lucky enough to have a second impact in the same spot, then everything would end in one great explosion. Dare he take the risk and insist on Tony reentering the ship?

"How long will the repair take?" Chris asked Tony over their radio.

There was no reply. Chris was about to repeat his question when a look of consternation came over his face.

"He has switched off. Or something's happened!" he gasped.

Nothing had happened. Guessing the difficult decision Chris and Sir George would have to make, Tony had settled it for them. Once he switched off his radio, they couldn't order him back into the cabin.

Quickly and efficiently the mechanic began his task of covering the dangerous gap in the casing. From a satchel strapped to his chest he drew out a sheet of tough but pliable metal specially designed for patching. Hooking himself to the nearest anchoring ring, Tony bent the sheet to the required shape. Then, from his belt, he took his rivet gun and began the tedious job of driving in dozens of rivets to hold the patch in position.

In the cabin there was great concern at the inability to communicate with Tony. If his radio had failed at this critical moment, it would be very serious. It would be equally grave if he'd switched his radio off deliberately, for this was something the astronauts were not allowed to do.

"Can you see him through one of the portholes?" Chris asked brusquely.

Serge and Morrey tried but reported that the mechanic was not in either field of view. If he was unable, or refused, to answer his radio, there was no way of communicating with Tony. His was the only suit for outside use that the ship carried. None of his companions could leave the cabin, and it would be futile to try to attract his attention by banging on the cabin wall.

"I'll just have to report what happened to Control," Chris sighed.

Sir George Benson was alarmed. Not knowing the reason for Tony's silence, he could only believe that it was due to a tragic fault in his radio. But the director's duty was plain. If Tony could not be called inside immediately, Sir George couldn't sacrifice four lives for the sake of one. Chris must be told to fire the motor even though the mechanic was out in space. To cover his emotion, the director spoke sharply to Gill.

"Tell Chris I order him to blast immediately."

The girl gasped, for she knew what this meant. So did the

other scientists who heard their chief's order. Tony was to be sacrificed to save the others!

"But—" began Gill.

"Do as I tell you, girl," the director said coldly. "That is, if you want to save your sister's life."

Almost choking, Gill sent Sir George's order to Gail.

Chris was staggered by Sir George's order. When Gail repeated her sister's message, the three astronauts could hardly believe it. When they asked Gail if she was sure this was what the director had commanded, the poor girl almost burst into tears. Yes—unfortunately—she was sure. Gill was equally upset, and the quick question and answer that flashed between the twins convinced Gail that this was the only way to save the ship.

Again Chris tried to call Tony, but the mechanic, less than halfway through his task, had kept his radio off. Mentally tortured, Chris begged Gail to find out if there wasn't some other way—if they could hang on longer before pressing the fatal switch. Sir George's reply was peremptory. The rocket motor must be ignited at once! Gail had no need to repeat to Chris what her sister had told her. All color drained from her face, and she almost fainted. Chris went over to the firing switch.

18

Chris's hand paused over the fateful switch. Gail, Morrey, and Serge were watching in horrified silence. If Chris fired the rocket, he would be condemning Tony to instant death. If he failed to do it, he would be disobeying Sir George, an unforgivable offense among astronauts, and risking their own lives because of the unrepaired damage to the casing. Never before did Chris Godfrey have to make such an agonizing decision.

And then, born out of his extreme mental torment, an idea began to form in the astronauts mind. Though his hand was poised only a few seconds, his brain was working at lightning speed. In utter wonder his companions saw Chris lower his hand. Deathly pale, he turned to the girl and spoke.

"Gail, this is perhaps the most important message you have ever sent. So I want you to listen very carefully," he said. As he slowly spelled out the request he was making to Sir George Benson, Morrey and Serge looked at Chris in utter amazement. Was he mad? Had the unbearable decision unhinged his mind?

At the Cape Kennedy Control the director was pacing up and down, waiting for Gill Patrick to tell him that his order had been executed. He was painfully aware of the turmoil it must have caused aboard Saturn I. He could well imagine the shock and consternation of the crew when he commanded them deliberately to sacrifice their close friend and companion. However, he had the utmost faith in the common sense and discipline of the crew's leader, and he had no doubt that Chris, even though it broke his heart, would pay this heavy price to save the lives of the rest of his crew.

Gill Patrick, reflecting the emotions of her distant sister, looked ghastly. The poor girl had shrunk from the task of conveying Tony's death warrant. But she had done it after Sir

George's argument about Gail's safety. Now she felt weak, as if all life had gone out of her. She dreaded getting Gail's thoughts telling her that Tony's fate had been sealed. Yet the message she received from her twin wasn't that at all. What it was about she couldn't understand, but she passed it on to the director faithfully.

Sir George had stopped his restless pacing as the girl began to speak and listened to her in astonishment. Mr. Gillanders, Professor Boronoff, and Dr. Rosenberg, too, were amazed at the suggestion that Chris, through the two girls, had made. Briefly, he proposed to allow the ship to fall below the outer rim of the rings, thus giving Tony time to complete his repairs and return to the cabin. Then, with the computer's help, he would navigate Saturn I through the gap in the rings known as Cassini's Division, after which he would blast off for Earth!

For a time none of the scientists spoke. It was such an astounding and dangerous suggestion that it had, literally, taken away the power of speech. The first reaction was that Chris must have lost his senses to make such a preposterous proposal. Sir George's own feelings were very mixed. At first there was anger that Chris had not carried out his order. Then amazement at the crew leader's suggestion quickly followed. He could well understand how repugnant it would be for his young friend to sacrifice the mechanic deliberately. Benson himself was strongly attached to Tony. But for Chris to try to save Tony by asking if they could pass through the gap in Saturn's rings!

As a scientist Sir George always liked to be sure of his facts. Any argument that he made or opinion that he held must be soundly based. Therefore he resisted the impulse to flash an angry and imperious no back to Chris. First he would get the computer to confirm that such a solution was impossible. Then there could be no further argument from Chris or anyone else. He had all the relevant data. A few terse orders had his staff scurrying about like scalded cats. Control became a hive of industry as the scientists prepared to feed the giant electronic machine. When they had finished, there would be a short wait while the computer digested the information. Then it would click out the answer, and Sir George would know whether

Chris's idea was as crazy as it seemed—or whether there was a slim chance of saving the mechanic's life with Chris's plan.

The director and his three deputies spoke together in low voices while this activity was going on. Gill took comfort in telling her sister that Sir George hadn't immediately turned down Chris's suggestion. She told Gail that the computer was now working out the answer. In a very short time they would know whether it was feasible to aim for the Cassini Division. If not, then the firing of the motor could no longer be delayed.

A rustle of excitement among the men grouped round the computer indicated that the critical moment was at hand.

The director strode toward the big electronic machine, and once again the men parted to let their chief through. A length of tape in which a series of small holes was punched, was coming through and passing into a "reading" machine. This apparatus was furiously typing out the result very much like a teleprinter. All eyes were focused on the message it was printing.

"We can do it," Sir George announced, long before the machine had stopped, "but only just."

He was right. The computer had decided that Chris's idea was feasible. Saturn I could be navigated through the Cassini Division and then break orbit. Such a maneuver would give Tony another thirty-two minutes outside the ship. If he was not inside by then, nothing—absolutely nothing—could save him. Benson went over to Gill and gave her the good news.

There were whoops of joy in the spaceship's cabin as Gail Patrick repeated her sister's message. Their leader's daring idea had at least given Tony more time. Surely he would be inside with them before it ran out. If only they could speak to him!

Outside the ship Tony continued his repair work. With no idea of the intense drama that he had brought about between his companions and Control, the mechanic was concentrating on covering the weak spot in their ship. It was taking longer than he had anticipated, for the edges of the gap in the casing were scorched and distorted. He had to force them back into

something like the original shape before he could finish fixing the patch. Then he floated over to the faulty lateral rocket. If he hadn't switched off his radio, no doubt Chris would have been yelling for him to go back inside. But Tony was determined that nothing should impair the safety and functioning of the ship if he could help it. After all, the structure and operation of the ship were his responsibilities.

"Keep by the portholes," Chris ordered his crew. "If you can attract Tony's attention, motion for him to come inside at once. I'll keep trying the radio."

But it was no use. The mechanic was at work on the damaged lateral rocket which wasn't within view of any of the portholes. Chris had no luck with the radio, and the minutes were ticking by.

Though the mechanic was within a few feet of his anxious companions, he might just as well have been a million miles away. As time passed, Chris became more and more exasperated and concerned. He had gained extra time for his young friend, but this was rapidly running out—and still not a sign of the stubborn mechanic. Would the dangerous operation of passing through the gap in the rings accomplish nothing? It was immeasurably more risky than breaking orbit, which Sir George had first ordered. If Tony obstinately remained outside while the clock was ticking his last chance away, then Chris would still have to take the heartbreaking action he had delayed.

"Sir George wants to know if Tony's back yet," Gail said suddenly. "He says we have only twelve minutes more."

"I suppose you've told Gill that he isn't," sighed Chris. "You'd better get our operational instructions from Control."

While the girl was in communication with her sister and Morrey was noting their orders, Chris made a last desperate attempt to call Tony. It was useless, and the astronaut resolved never to venture on another trip unless the ship carried at least two outside space suits. If only Saturn I had been equipped with another suit for space, he would have been able to go outside

and drag Tony back by the scruff of his neck.

Five minutes to go. The eyes of the crew were glued to the moving fingers of the ship's chronometer. As the second hand moved around steadily, it seemed to be writing Tony's death warrant. Gail shivered as she thought of the terrible thing that must happen soon.

"Look!" yelled Morrey. "He's coming back!"

All eyes turned toward the air lock above which the red bulb was glowing. From this they knew that Tony was inside. Gail gave a little sob of relief, while Chris didn't know whether to vent his wrath on the mechanic, or to hug him with joy.

"Quick, to the controls," he called to his fellow crew members. "We'll start turning the ship at once."

Even as Morrey and Serge went to their places the airlock door opened and out clambered the space-suited Tony and strangely enough his radio had begun to work.

"What's happening?" he demanded over his apparatus, for his helmet was still firmly secured.

Neither Chris, Morrey, nor Serge had time to reply. All their concentration was needed to carry out the difficult maneuver that would navigate the ship through the Division, and so save all their lives. It was Gail who went over to the mechanic to help him remove his helmet, but before this could be done an imperious sign from Chris ordered them to their couches. As Gail and Tony scrambled on and grabbed the straps, Saturn I was jerked to one side as the first of the laterals roared into life. For the next couple of minutes, the tension in the cabin was almost unbearable as Chris, Serge, and Morrey fought to steer the ship through the gap to safety.

The seconds ticked on. Would the crew manage this difficult feat of navigation? Though the Cassini Division is nearly seventeen hundred miles wide, this is very narrow by astronomic standards. At the speed at which the ship was moving, it wouldn't take long to shoot past it. In addition Saturn I must pass through as near as possible to the center of the gap, for here the chance of an encounter with a wandering

moonlet would be reduced to a minimum.

Though he was still clad in his space suit and helmet, Tony could sense the strained atmosphere in the cabin. He couldn't understand why his friends were in such a frantic hurry to change course. Chris was obviously angry with him for switching off his radio. But then Chris hadn't seen the dangerous rip in the outer casing. Unless he had, Chris was unlikely to appreciate how essential it had been that it should be repaired. It was better to have the anger of his leader than an unsafe ship, Tony decided. It had been absolutely necessary for him to stay outside until the damage was repaired.

Chris was now making his way toward one of the portholes. Outside he could see the vast arc of Ring A with its countless points of light. Then he looked and saw the inner ring shining with even more minute sparkles. Right ahead was the good old Cassini Division, and the ship was streaking plumb toward the center. Chris heaved a sigh of relief, though he wouldn't be able to relax completely until they had shot through the gap and were clear of the rings altogether. Thanks to that young idiot Tony, it had been a close shave. At the first opportunity, he'd have a few questions to ask that young man.

Then another problem arose to plague Chris. As Saturn I raced toward the Cassini Division, he could see that the points of light in it were more numerous than he had expected. Each point was a tiny piece of matter whirling around the giant planet at great speed. If the ship came into contact with too many of the shining particles, the casing would be penetrated, and they would be in serious trouble. Too many penetrations would cause them to lose all their oxygen before repairs could be made, and then the expedition would come to an abrupt end. Perhaps it hadn't been such a good idea to "shoot" the gap after all. Should he have blasted off when first ordered to do so by Sir George? Would his consideration for Tony cost the lives of all of them?

By this time the mechanic had removed his suit and helmet.

"Will someone please tell me what's happening?" he demanded.

"Oh—just that your little jaunt outside may have written finish to all of us," explained Morrey icily. "Sir George ordered us to break orbit immediately while you were still outside, because the rings are dragging us down. Chris got permission to extend the time by trying to navigate the ship through the Cassini gap."

"You came back just in time," Serge joined in. "In another minute or so it would have been too late. Why did you stay out so long, Tony?"

The mechanic was staggered at the news. How could he explain to his friends what it meant to him to see that his part of the job was well done?

"Never mind about that," Chris called sharply from the porthole. "What happened to your radio? Did it develop a fault —or did you switch it off?"

Before Tony could reply a strange sound filled the cabin. It sounded like rain on the outside of the ship. But of course there was no rain out here in space, Gail told herself. She looked at her companions' faces and saw that they had all turned pale; They knew what it was. It wasn't rain—at least not of water. The ship was passing through the Cassini Division, and it was plowing its way through a curtain of tiny bits of matter too small to see. It was the impact of these innumerable fragments that caused this heart-chilling sound.

"I hope the outer casing can take it," Morrey gasped. That made Tony feel better.

"It certainly wouldn't have done so if it hadn't been repaired," he pointed out coolly.

Chris and the others suddenly realized that what Tony had said was true. If the mechanic hadn't put a patch on the hole, the thousands of tiny particles would have riddled the exposed inner case!

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By the use of several of the lateral rockets, including the one Tony had repaired, the ship was edged into the right position for blasting. Then, with all the crew secured on their respective couches, the firing switch was pressed, and the powerful chemical motor roared into life. Its thrust held the crew down firmly, but no one minded this temporary discomfort. Soon they would escape from the clutches of this vast planet and its beautiful, but deadly, rings. Then would come the long sleep while they journeyed home.

As he waited for the motor to finish its run, Chris pondered the problem of Tony. Should he report him for that prolonged stay outside the ship? He still didn't know whether his friends radio had failed or whether he'd deliberately switched off. To tell the truth, Chris really didn't want to know. Though Tony had almost brought them to disaster, he had also, without doubt, saved them. Maybe it would be better not to pursue the matter any further, for if Tony admitted interrupting communication, then Chris would be compelled to send in a report. So, he decided to forget about it for now.

Had their expedition been successful? Of course, it hadn't gone as planned. But they had found out a great deal about Saturn and had experienced the strange effect of its unique rings. This would be of immense help in planning the next expedition. Gail had been really great in the way she got their reports back to Earth. The radio, too, had worked overtime. But it was from personal reporting that the most information would be given to Sir George and his colleagues. Their journey back was the last stage of the expedition, so there must be no mistakes now.

Promptly, after the preset interval, the chemical motor fell quiet, its powerful thrust fading away. Once more the

astronauts were weightless, and for a few moments they enjoyed this exhilarating condition. Then Chris called them to order. There were many observations to make, much data to be transmitted to Control. No one could really relax until the computer at the Cape confirmed that Saturn I was on the right flight path for the long journey home.

In between more serious messages, Gail and Gill were exchanging excited chatter. Although the actual duration of the homeward journey would be nine months, to the twins it would seem only hours. Both girls would once more be under hypothermia, for their strange powers would be utilized again during the voyage home. Gill was able to tell her sister that their parents would be at Cape Kennedy for the ship's landing. Sir George and all the others at Control were as cheerful as crickets after the tension of the last few hours.

It was the director himself who was nodding approvingly as he scanned the computer's answer. Just one more slight adjustment of their ship's course, and the crew could go to sleep with confidence. The long steady thrust of the ion motor would carry them back, while for Chris and his crew time would stand still. Sir George wrote out the crew's instructions for Gill to transmit. So accustomed had he now become to telepathic communication that Billy Gillanders had to remind him that confirmation must be sent by radio. This was a precaution that the director himself had insisted upon in the early days. Now it was continued as a formality rather than in expectation that it would be of use.

Hypothermia. Telepathy. Benson allowed himself the luxury of speculating for a few moments on these new tools in the conquest of space. Until their appearance the possibility of Man breaking out of the Solar System had been remote indeed. Now that the Sun's family of planets had been, or soon would be, explored, it was natural for men with Sir George's questing spirit to look beyond. Somewhere, out there, Benson was convinced, there must be other planets like Earth on which intelligent life had developed.

According to astronomers the universe was filled with

hundreds of millions of galaxies, each one having hundreds of millions of stars like our own Sun. Unless our star was unique in having planets, the number of worlds similar to Earth must be countless. Surely it was illogical to think that life had evolved only here. Indeed the discovery of the last traces of plant life on Mars had proved this. If only we could meet and talk with other living beings, perhaps far more intelligent than ourselves! With an effort Sir George wrenched himself back from these dreams of the possible future to the present.

"Billy," he said to Mr. Gillanders, "let me know when Chris has acknowledged the flight corrections. Also get Gill to give you her sister's impressions of the morale of the crew. We haven't had an explanation yet of why that young Tony was out of the ship so long or what was the matter with his radio."

While the director paced around the room, pausing before some of the instruments, Mr. Gillanders went and sat by Gill. She had already flashed out the computer's instructions, and was soon able to tell the deputy director that Chris had received and understood them. When she was asked to get a report on the crew's morale, Gill became a little confused. How could she betray what Chris and the others had felt about Tony's obstinacy? Gail had told her things were all right now—but would Sir George understand? When she assured Mr. Gillanders that all the crew were feeling fine, just fine, he didn't press her.

"Gail says Tony's radio wasn't working," Gill answered Billy's request for information. The deputy director gave the girl a long, hard stare, which she met with wide-eyed innocence.

"I'll bet she knows differently," he mumbled to himself.

"I expect it will be in Chris's report," he said aloud.

"Good-bye, Saturn. Or maybe *au revoir*," Morrey called out as he took a last look through the observation window. The ship was now on a true course home, and the crew had nothing else to do.

"Everyone feel tired? We may as well take a short nap," Chris

said to his companions with a grin. They knew he meant it was time to retire to their couches and let the AHA send them to sleep. How wonderful it would be to wake up in the vicinity of good old Earth! It would be interesting to see if their friends had aged during the time they'd been away.

"Get ready for your helmet," Serge called to Gail as they all took a final look around the cabin.

"Must I rub this wretched stuff into my hair again?" wailed the girl as the Russian gave her the tube of special paste.

"Better that than having your hair shaved off," Morrey reminded her. "Come on, we can put up with it."

With a grimace Gail began the task of working the paste well into her hair. Meanwhile an interested male audience kept up a running fire of comment.

"Are they being rude to you?" Gail flashed the question to her sister, who was doing the same thing back on Earth.

"No. Everyone's much too polite," Gill replied, "but I'll be glad to get rid of this awful mess."

"Me, too," agreed her twin. "Morrey and Serge are fixing my helmet. See you soon."

To the two Patrick girls and to Chris and his crew the voyage to Earth would seem to be over soon. But to Sir George and his staff at Control there was still a wait of nine months while Saturn I made its long and perilous journey home. Benson prayed silently that there wouldn't be any more crises for his young friends as the expedition entered its last phase.

In the cabin of the good spaceship Saturn I there was the usual atmosphere of relief that the homeward journey had begun. The crew exchanged weak jokes at which they all laughed uproariously. It was a symptom that tension was relaxed and that in what would seem to them a very short time they would be back again with their friends and families. Gail was laughing at the antics of the crew as they all settled down ready for the transparent covers to descend. Chris had switched on the AHA and there was nothing to do now but wait.

Suddenly Gail felt a prickling sensation in her arm, and for a moment she wondered what it was. She knew she was all right, so the feeling must have come from Gill. Often when one twin felt pain or discomfort, the other one did too, in sympathy with her sister. As she watched her cover start its slow descent, the reason for the sharp feeling in her arm flashed upon her.

"Antifreeze!" she yelled out suddenly.

In the excitement of last-minute preparations, they had all forgotten one vital item. They hadn't had the injections of the substance that would prevent their bodies from turning into solid ice! Without it their blood would freeze and death would be inevitable. When they arrived back in Earth orbit, the AHA would fail to resuscitate them. They would have lost their lives because of a careless oversight.

There was a moment of stunned silence as the significance of Gail's cry struck the astronauts. Before he could feel the pangs of self-condemnation overwhelm him, Chris was working frantically at his straps. The switch to start the apparatus was just above his head, but to reverse the process he had to alter the automatic timer beneath his couch. Tony, Morrey, and Serge were also struggling desperately to free themselves. With the covers descending inexorably the gain of even a fraction of a second would be priceless. It might mean the difference between switching off the AHA in time or being imprisoned beneath the transparent covers while they froze to death. Only Gail lay motionless, watching with horror the menacing cover above her. Mercifully her sister had already succumbed to hypothermia, so she wasn't tormented by the astronauts' desperate situation. But neither did Control know that a human error was about to terminate the elaborate expedition to Saturn.

Serge freed himself first. By now his cover was almost down. With a desperate wriggle he managed to squeeze through the narrowing gap. As quick as lightning the Russian flung himself at the vital switch beneath Chris's couch. Then he sank to the cabin floor, exhausted by his frantic efforts and the wonderful feeling of relief.

There were racing hearts for a few minutes in the cabin of Saturn I. The danger was over, and the transparent covers had retreated to their raised position. But the five young people knew they had escaped by a very narrow margin. Self-reproach flooded over Chris. It had been his responsibility to give the injection—and he had forgotten it. Of course he must report his failure to Control and hand over his leadership to Morrey or Serge. After this he could never hope to go on a space flight again.

"Morrey and Serge," Chris began in a strained voice, "one of you had better take charge from now on. I've failed in my duty. I am no longer fit to lead you. It's as simple as that."

There was a gasp from the other four. What nonsense was this? Had Chris gone out of his mind? Of course he should have given them their vital injections. But they had all been equally guilty of overlooking it. As their leader, Chris had far more responsibility on his mind than either of them. If he was to blame, so were they. No, they couldn't let Chris do this foolish thing. He was their leader, and they wished for no one else. In spite of the presence of Gail, the three male members of his crew expressed themselves with great force at this ridiculous idea of their leader. Both Morrey and Serge refused point—blank to take over, and Tony made it clear that he would accept orders from no one but Chris himself. Gail added her plea, and at last Chris gave way.

"All right," he sighed. "I'll carry on till we get back. Then I'll hand in my resignation to Sir George."

This unleashed another torrent of argument, and the loyalty of his friends warmed Chris's heart. It would be a wrench to part from them all after the many adventures they'd had together. He'd been leading them for years—perhaps it had been too long. His feeling of guilt lessened a little under pressure from the others.

"Does Gill know?" Serge suddenly asked Gail.

The girl shook her head and explained that her sister had already been frozen. So Control knew nothing about it.

Morrey said, “Good. Give us our shots, Chris, and well sort the other matter out when we get back.”

Chris looked hard and long at his companions. Could anyone wish for a better crew than he had? Their insistence that they should share the blame touched him, although he knew it was his responsibility. Well, maybe he would leave matters as they were till after the voyage was ended. Then he’d have to report to Sir George Benson and tell him all about his lapse.

“Back on your couches, then,” Chris called out, and with wide grins of relief his crew obeyed. After he’d injected them all and taken a dose himself, he snuggled on to his own couch, secured the straps and set the AHA in motion once more. This time there were no last-minute hitches, and soon the cabin was silent. Five figures lay motionless—and so they would remain while the ship traveled those millions of miles back to Earth.

Mr. Gillanders turned away from Gill.

“She’s away,” he announced to the little group of men who’d been assisting. The wires from the sleeping girl’s helmet led to the instruments which would monitor conditions in Saturn I. Sometime, the deputy director supposed, he’d get used to the idea of telepathy. Maybe in a dozen years it would be commonplace, provided enough people could be found with the gift of these remarkable twins.

Now the last radio messages from the crew were coming in. It still seemed queer that they had been sent more than an hour before and that some of the information they were bringing was history. Sir George was listening to the messages idly. The most useful information was shown on the array of meters and dials, and he wandered along the vast bank of instruments. Almost everything that was going on in that distant cabin was revealed somewhere in this long room. But the picture presented to the watching scientists was an hour out-of-date.

The director was now striding rapidly from one of the recorders toward Mr. Gillanders.

“They are late,” he declared. “The electrocardiographs are

still active. They should have been quiescent ten minutes ago. Anything on the radio?"

"No," Billy told his chief. "Instructions are to switch off just before activating the AHA. No hold-up there."

"I wonder what's happened," Benson muttered. "If they haven't gone under in another ten minutes, we may have to defrost Gill for a report."

"Hope we don't have to do that," Mr. Gillanders said. "Besides they may be under hypothermia by now, and Gill wouldn't be able to get anything from her unconscious sister."

"True," the director conceded, "but I don't like it. Let's see what's happening now."

"That's better," Benson was saying a moment later, for the wavy lines drawn by the five needles on the ECG's had all flattened out. Chris and his crew had gone into a sleep from which they wouldn't awaken for nine long months.

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Bombarded by interplanetary dust but otherwise safe, Saturn I was on the last stage of its journey back to Earth. It had been turned around by "signals from the Cape, and the ion motor had been slowing it down for many hours. Inside, the crew still lay motionless on their couches, only the tiniest of pulses indicating that they were still alive. Soon the AHA would swing into motion, and they would be returned to consciousness.

Now that the ship was so near, radio signals were only about a second and a half late—a much more comfortable state of affairs. As far as Gill was concerned, her job was over, and she could now be defrosted. However, Sir George had promised that she should be aroused at the same time as her sister, for he knew how concerned the girls were that they should remain exactly the same age. For his own part the director, too, wished to keep the twins' hypothermia a tandem affair. Until more was known about the mechanism of telepathy, he was determined to avoid anything that might weaken the invisible link between Gill and Gail.

Mr. and Mrs. Patrick had arrived at Cape Kennedy for the awakening and return of their daughters. The last eighteen months had been a period of great strain for them and Sir George had done his best to ease the difficult time by constant bulletins on both girls. Within a very short time of their arrival, Mr. and Mrs. Patrick were taken to see their sleeping daughter, Gill. The faint quiver of the ECG confirmed that she was alive, and of course she didn't look a day older than she had a year and a half ago. Although they could see only one daughter, the Patricks knew that the other one would be looking exactly the same. Mrs. Patrick was counting the hours until she could embrace those two remarkable daughters of hers.

Because the Saturn expedition had covered a greater distance and had lasted longer than any other undertaken by Man, world interest was intense. Journeys to Lunar City, even to Mars and Venus, were no longer of great news value. But here was a ship returning from the most distant planet yet visited, the one with the spectacular system of rings. This was an achievement that everyone wanted to know about.

While the vast distance, the destination, and the duration of the Saturn expedition were sufficient to grip the imagination of the world, countless millions were equally fascinated by hypothermia—the new method of preserving life almost indefinitely. During Saturn's voyage, discussion had raged about the possible consequences of hypothermia. There was speculation about the effect of making time stand still for those six young people. Would they really be the same age as they had been a year and a half before? Or would the, life processes speed up after defrosting so that they would soon catch up with their true age?

Several very wealthy people had formed a syndicate hoping to buy hypothermia apparatus. They wanted to make arrangements to have themselves put to sleep for a hundred years. One bright gentleman conceived the idea of being aroused every century for just a week. He calculated that he would live some two hundred thousand years. Unfortunately for the plans of these enterprising individuals, AHA was not for sale, no matter how many millions were offered.

By this time Sir George Benson was used to the great influx of reporters and cameramen who came to cover the spectacular departures and returns for which he'd been responsible. But never had he seen anything remotely approaching the mass invasion of Cape Kennedy that was now taking place. Every kind of accommodation had been snapped up in Florida at fabulous prices, by representatives of newspapers and television networks from all over the globe. Since this was not nearly enough, a tented city, with ever-widening boundaries, had sprung up almost overnight.

A forest of portable radio and television masts had sprouted alongside mobile studios of all shapes and sizes. Generating capacity had been trebled in a crash program to satisfy the demand for power for the hundreds of transmitters. One contractor had offered to erect staged seating—for sale at twenty dollars a place—in sight of the expected landing area. A congressman had suggested that the ship's touchdown be diverted to Dulles Airport in Washington, where the public could view it. The anxious wait for the spaceship's return and the continued pressure of reporters almost drove Sir George Benson out of his mind.

"Billy," the director pleaded, "will you, Rosenberg, and Boronoff get these newsmen off my back?"

But each of the deputy directors had pressing work to do.

"Very well," sighed Sir George, "call them together. I might as well get it over."

The gathering of the men and women of the press was the largest anyone at Cape Kennedy had ever seen. None of the buildings was large enough to hold them, so the interview had to take place out-of-doors.

"Ladies and gentlemen," Sir George began, his voice booming from numerous loudspeakers, "Saturn One is due to return to Earth just sixteen hours from now. You will understand, therefore, if pressure of work compels me to cut out our usual question-and-answer session after I have given you a situation report on the expedition.

"The expedition has been highly—though not one hundred percent—successful. Indeed I can't remember a single expedition that has achieved everything. Two completely new techniques have been put to the test—hypothermia and instant telepathic communication. Without these new tools UNEXA would never be able to probe so far into the Solar System. Until we can discover a method of traveling faster than light, our radius of activity is circumscribed by astronomical standards. These techniques are helping to bridge the gap between the inner planets and the more distant members of the Sun's

family. At this stage I can't say yet whether these techniques can be developed sufficiently to allow us to break out of the solar system. Time will tell.

"As you know, the crew of Saturn One have been put into a state of suspended animation during this very long voyage. They, together with Gill Patrick, who is still under hypothermia in Control, will shortly be revived in readiness for the landing maneuvers. This defrosting will take place in"—here Sir George glanced at his watch—"two and a half hours. When the process has been safely completed, we can say that the expedition is as good as over."

Hundreds of furious pencils had been scribbling on hundreds of notebooks while the director was speaking. Everyone had been far too busy absorbing Benson's statements to make any noise. Considering the vast crowd, it was strangely quiet. Sir George paused for a few seconds, and when it seemed that a torrent of questions was about to be unleashed, he hurried on:

"Perhaps the most startling discovery the expedition reported was the amazing gravitational pull of Saturn's rings. It turned out to be far more than we had anticipated and very nearly caused disaster. However, we have a resourceful crew and a competent stall here at the Cape, so we were able to scrape through by the skin of our teeth. It will take some time to digest all the information that the Saturn expedition has provided. Now I have an important announcement to make."

As if by a stroke of magic, the forest of scribbling pencils was stilled, and a thousand pairs of eyes were turned toward the director expectantly. Speaking slowly and clearly into the microphone, Sir George Benson made his announcement.

"The President of the United States is coming to welcome the astronauts on their return."

A ripple of excitement spread over the reporters as they wrote furiously. Then they looked up toward the speaker for more information. But Sir George had taken advantage of the effect of his surprise announcement to make his escape.

Already he was walking rapidly toward the main buildings of Control.

There was not a sound in the cabin of the spaceship Saturn I. For all these long months the five figures had lain motionless while their vessel had hurtled through millions of miles of space. But soon that would be altered, for the ship was upon the last stage of its historic flight. The crew would have much to do to bring their vehicle home, and before long that silent cabin would be a bustle of activity. Meanwhile the fateful moment was approaching when life should return once more to the waxlike images of Chris and his crew.

Click! Had there been anyone conscious in the cabin he would have realized the significance of that one tiny sound. The automatic apparatus had started to work; the five statues would soon be statues no longer. A watcher would have seen the five transparent covers start to rise ever so slowly. If he had bent over the still figures, he would have seen signs of color returning to pallid faces. Later he would have noticed the first indication of breathing and then, one by one, have seen the eyes of Chris and his crew flutter open.

"We—we must be home!" gasped Tony, the first to speak.

"It's incredible," Morrey said in a cracked voice. "It seems only seconds since we escaped from Saturn."

"Gill's awake, too," cried Gail happily. "Oh, it will be so good to see her. Everyone's crowding around her, she says."

Serge was warming up the radio. From now on they would be using the old method of communication. The girls could chatter away to their hearts' content. When he had assured himself that all his crew were fit and well, Chris began the task of taking the innumerable instrument readings demanded by Control. On the last stage of their journey, until they could get a fix on the Cape's radio beam, the ship would have to be steered manually. Also velocity and distance from the Earth would have to be maintained within the fairly close limits decreed by the computer.

While the male members of the crew went happily about their tasks, Gail helped the proceedings with her own and her sister's comments. Tony, Serge, and Morrey, as well as Chris, had their quota of greetings from friends on the ground. Gail's squeal of delight probably echoed her sister's when Mr. and Mrs. Patrick were shown into Control. A few seconds later the girl in Control was explaining to the girl in the spaceship that their mother's hair was a little grayer and their father's bald patch noticeably bigger than when they had last seen them. It was this, more than anything else, that brought home to the twins the length of their separation.

A sudden high-pitched whine filled the spaceship's cabin. There was a relieved cheer from the crew. Saturn I had been navigated right into the radio beam. From now on it would be plain sailing to set the ship right down on target. The spectators at Cape Kennedy would not be disappointed by a landing far away.

Now Chris and his crew were singing untunefully with sheer joy as they set about their last tasks. The great chemical motor was ignited for the last time, slowing their headlong rush to Earth. When the velocity was almost zero, the motor was shut down to a gentle whisper. Saturn I could float down to Earth with the motor nearly counteracting the pull of gravity. When that lovely sound, the high-pitched whistle, faded slightly, a brief squirt of one of the lateral rockets would shepherd the ship back into the homing beam.

The excitement at Cape Kennedy was almost unbearable. Though the staff had witnessed the completion of many successful missions, the Saturn expedition had many unique features. What a triumph it would be the moment the astronauts set foot on Mother Earth! Eighteen months they had waited for this day—a year and a half of constant vigilance and anxiety. Now it would soon be over, and four young men—oh,

When the President's huge silver plane touched down, Sir George and his deputies were lined up to meet him. There was a great shaking of hands and exchanges of greetings.

"Not too late, am I?" the President asked.

"No, Mr. President. It will be another two hours before the ship lands," Sir George told him.

A small motorcade hurried the distinguished visitor and his retinue to Control for some refreshment. Later, the President would watch the landing through a telescope. Within minutes of the touchdown, Chris and his crew would be brought along to receive the President's congratulations.

"When are you going to take off your helmet, dear?" Mrs. Patrick asked Gill.

"Gosh, Mom, I clean forgot about it," the girl burst out. "I'm so excited about seeing Gail, Chris, and the others."

She was about to take it off, and then she stopped.

"What's the matter, dear?" asked her mother, wondering if there was anything wrong.

"I just can't take it off with all these people around," Gill whispered. "My hair's a mess!"

"Here we come!" Morrey sang out happily.

The coastline of Florida had been growing larger. Now, from a height of twenty-eight miles they could just make out the buildings of the Cape. Somewhere down there was Sir George Benson and his staff, Mr. and Mrs. Patrick, and—if Chris knew anything about it—some newspaper people whom he hoped he could avoid.

"Eighteen miles," sang out Morrey. He made it sound as if he were starting an oratorio.

The ship would now be entering the atmosphere, but, of course, there was no need to use the huge parachute kept for emergencies. A parachute landing, at the mercy of the winds, was far less accurate than the pinpoint precision achieved by the radio beacon and the whispering motor.

"Hey! What's this?" Chris called out in sudden alarm.

His companions hurried to the porthole. The ground was

rising steadily toward them, and now they could see the cause of Chris's concern. For miles around the Cape, it seemed, the ground was thick with people and cars. Never before had they seen such a multitude awaiting their return.

"Er—I suppose it's too late to turn back, isn't it?" asked Tony in mock seriousness.

A smile flashed briefly on Chris's face. Then he became serious again. Those crowds below would be in grave danger if anything went wrong with the landing. To mass so densely near a landing site was asking for trouble. He couldn't use the parachute now, even if he wanted to.

"There they are!"

Several thousand pairs of eyes were straining to pick up the tiny point of light in the cloudless blue sky. Soon everyone could see the silver ship, base first, riding nearer on its short tail of fire. An excited cry went up, telescopic lenses zoomed, commentators spoke rapidly into mikes. Inside Control the President had been watching through a telescope for some minutes. Gill, still with helmet, was jumping up and down like a cat on a hot tin roof. She joined Sir George in the score of vehicles that would race out at the touchdown to bring the astronauts back to Control.

It was a perfect landing! Never had the regulation cooling period of five minutes seemed so long. At last, at a signal from Sir George, the scientists and technicians were able to rush forward just as the ship's hatch was opened from inside. No one remembered very much about the next few minutes, but disaster was narrowly averted when Gill and Gail became locked in each other's arms halfway down the movable steps pushed against the rocket's side.

"We've a surprise for you," Sir George informed his young friends happily as they sped back to Control in a minibus. "The President of the United States is here to meet you!"

There were gasps of surprise from the returning astronauts, and no one saw the look of consternation exchanged between the twins. Another crowd was waiting at the Control buildings.

Chris and his crew were soon lost in a happy back-slapping melee by the rest of the staff.

"Come on. Are you ready?" called the Director. "I must take you to meet the President."

Chris, Morrey, Serge, and Tony disengaged themselves from the crowd. But where were Gill and Gail?

The girls had disappeared. No one had noticed them slip away, not even their parents.

"Find them quickly," snapped Sir George. "We can't keep the President waiting."

A score of men went off in different directions, but it was Billy Gillanders who returned with the news.

"I'm afraid the President will have to wait about fifteen minutes," he sighed with resignation. "They're washing their hair!"