

October

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# AMAZING STORIES

HUGO GERNSBACK  
EDITOR



*Stories by-*  
**H·G·Wells**  
**Ray Cummings**  
**Garret Smith**

EXPERIMENTER PUBLISHING COMPANY, NEW YORK, PUBLISHERS OF  
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JULES VERNE'S TOMBSTONE AT AMIENS  
PORTRAYING HIS IMMORTALITY

# AMAZING STORIES

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## Contents for October

### Around the Universe

By Ray Cummings..... 626

### Æpyornis Island

By H. G. Wells..... 662

### The Winged Doom

By Kenneth Gilbert..... 668

### Treasures of Tantalus

(A Serial in 2 Parts) (Part I)

By Garret Smith..... 676

### The Paradise of the Ice Wilderness

By Jul. Regis..... 701

### Our Cover

this month depicts a scene from Ray Cummings' "Around the Universe" in which the Professor of Knowledge and a Scientist and Tubby, the other occupant of the Space Flyer, see another Space Flyer, somewhat different in shape from theirs, hovering almost directly above them, showing like a dark spot in the Firmament.

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## In Our Next Issue:

**TREASURES OF TANTALUS** (Conclusion) by Garret Smith. Though Professor Fleckner's *telephonoscope* bids fair to act for the public good, because of its ability to penetrate the thickest walls and look into the most submerged hiding places and so unearth a gigantic criminal trust, avariciousness, with the help of newer and cunning devices, throws the world into panic and a veritable reign of terror. This well-known author makes the most out of the various developments of the plot and intricacies and gives us a tremendously interesting conclusion to an unusually good scientific story.

**HICKS' INVENTIONS WITH A KICK** (The Hicks Electro-Hydraulic Bank Protector) by Henry Hugh Simmons. Being a true inventive genius, Mr. Hicks, despite his luckless demonstrations, bobs up once more with a more marvelous invention than ever. This time it is a contrivance for the absolute protection of banks against any and all robbers. High water pressure plays an effective part here—too effective in this demonstration, in fact.

**THE ASTOUNDING DISCOVERIES OF DOCTOR MENTIROSO**, by A. Hyatt Verrill. This, no doubt, is *the* story of the year. Our well-known author is delving into the realm of time in this most absorbing story, and before you get through reading it your head will be in a whirl. What is the past? What is the present? Can we step into the future? Can you witness something now that happened yesterday, and can you actually see something that is going to take place tomorrow? Dr. Mentiroso shows you how it is done, backing it up by the best of reasons and scientific facts that you will not be able to refute. Don't fail to read this story.

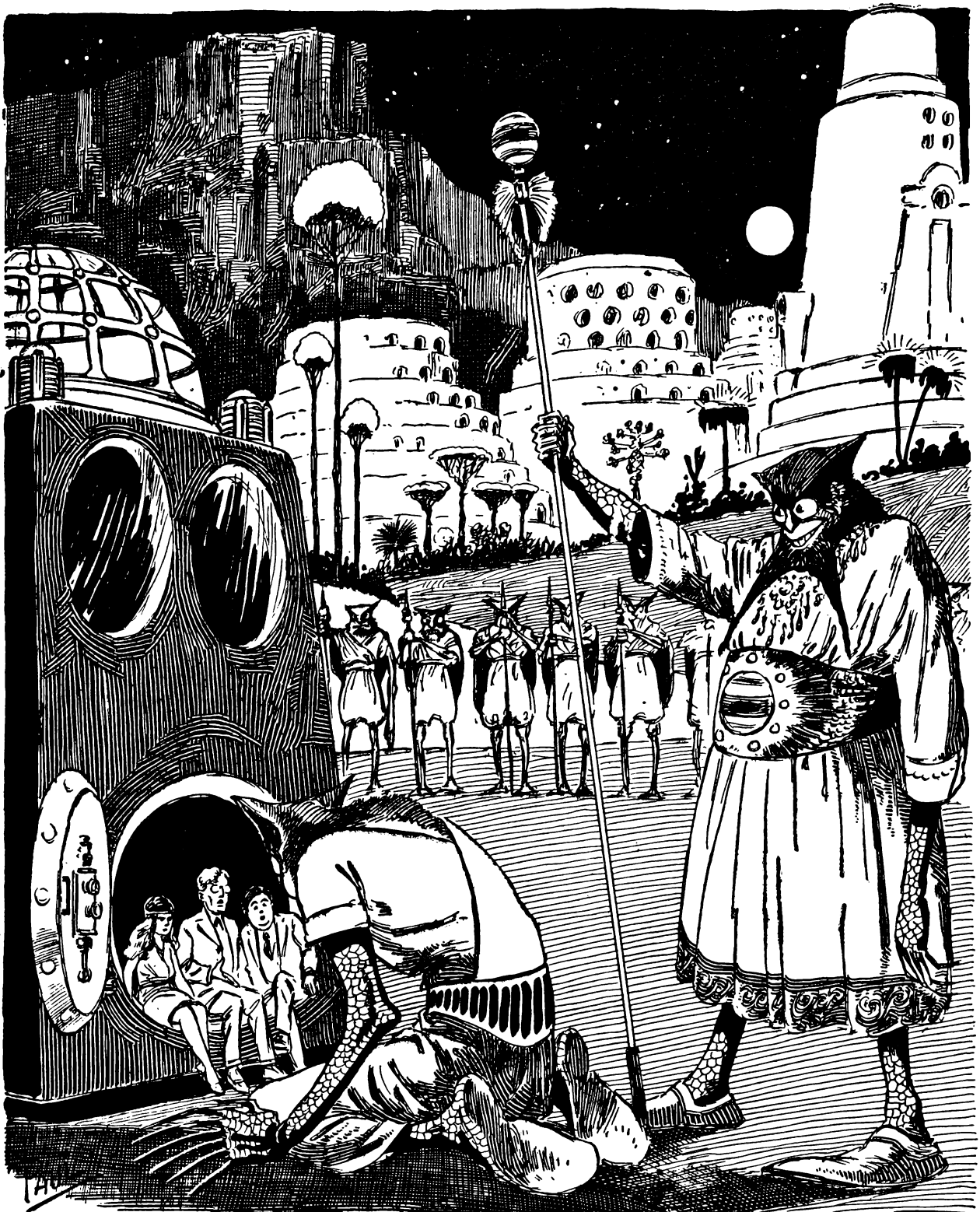
**A STORY OF THE STONE AGE**, by H. G. Wells. Our famous author has gone back to the stone age and develops a picture before your eyes that is most astounding to our present-day experience. Yet there is no question that the things that Mr. Wells speaks of must have existed in the far gone age when man was still young and not much more than an animal. If you ever wanted to know what your great great ancestors were doing in their day, you positively must read this story.

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# AROUND THE UNIVERSE

*By Ray Cummings*



The Great Mogul of Jupiter was a towering giant some fifteen feet tall. The audience with His Highness was held in front of the Space Flyer as the travelers found it difficult to walk on Jupiter, owing to the great gravitational pull which increased their weight considerably.

CHAPTER I

In Which Tubby Becomes Aware of His Wonderful Gift, and Accompanied by Sir Isaac Swift DeFoe Wells-Verne, Starts for Venus



"**T**HAT ain't so," Tubby spoke up suddenly from the seclusion of his seat across the room. He glanced at the three men who sat around the little table under the circle of light, their poker game temporarily suspended, the cards and chips pushed to one side. "That ain't so nohow. Don't you tell *me* it is!"

"He ain't tellin' *you*," responded one of the men caustically.

"I ain't sayin' what *I* think," the first man defended. "I'm tellin' you what *he* said. The Stars goes right on past the Sun—right to the edge of Space—only there ain't no edge of Space. *That's* what he said."

"You're right, Jake," agreed the second man. "That's what he said."

Tubby glared belligerently, and brought his pudgy fist down upon the flimsy arm of the camp chair into which he was wedged. "That ain't so. There must be an edge to Space," he snorted. "How can Space go on forever? That ain't got no sense to it."

The first man continued patiently:

"*He* said if you could imagine the edge of Space with nothin' on beyond, that would just be more Space, wouldn't it?"

This question addressed directly to Tubby, confused him momentarily. The place where Space stopped with nothing on beyond! Sure that would just be more Space. Then, quite suddenly, the flaw in the argument struck him.

"You got the wrong idea," he declared condescendingly. "I ain't never said there was nothin' on beyond the edge of Space."

"He's right, Jake," the second man put in. "He ain't never said that."

The first man stared.

"You're assumin' somethin' you ain't got no right to assume," Tubby went on mercilessly.

The first man collected his scattered wits. "Well, what *did* you say?" he demanded.

"I didn't say nothin'," Tubby responded. Then to change the subject he added abruptly:

"Who was he—said all this?"

"A Perfessor—an—an Astronomer," replied the first man. "Us heard him give a lecture last week."

"Did he say the moon had people on it?" Tubby persisted.

The first man, confused by the sudden introduction of this new topic, answered sullenly:

"No, he didn't say nothing about no people in the moon."

"What you gettin' at, Tubby?" the third man put in. "We're talkin' about Space, not no men in the moon."

Tubby smiled genially. "*I'm* talkin' about the moon. I read a book by a guy named Wells. Now he says——"

"*He* ain't no Astronomer," the first man objected. "What's he know about it?"

The third man continued the attack.

"Stick to what you were sayin', Tubby. *You* said there would be somethin' at the edge of Space—not just more Space."

"I didn't say nothin' about it," Tubby repeated. "But *I will say* . . . There *is* an edge to Space because when you get there you wouldn't find more Space, you'd find——"

"What?" demanded the first man aggressively when Tubby hesitated.

"Why—why more Land—that's what you'd find." Tubby glared through the blue haze of the tobacco smoke that hung like a pall about the unventilated room. "More Land," he repeated triumphantly. "Ain't that argument enough? Don't that show Space can't go on forever?"

The third man was gathering up the cards and chips. "Let's go ahead with the game," he suggested. "This here argument ain't got no sense. You shut up, Tubby—you ain't in this."

"Right," said Tubby, with the magnanimous air of a victor. He shifted his feet more comfortably on the second camp chair and leaned back contentedly. "You don't want *me* talkin'. I can shoot your argument full o' holes in no time."

The first man insisted on proceeding with his astronomical narration, while Tubby listened idly. It was then—as he sat there vaguely sorting out in his mind the miscellaneous statements regarding stars, planets and comets which his friend was making—that his great gift was revealed to him. The revelation came unobtrusively—so unobtrusively in fact, that at first Tubby did not grasp its real significance.

"I *wish* they'd quit that talkin' an' go on with the game," he murmured to himself with annoyance.

It seemed quite logical that at that instant Jake should decide he wanted to resume the poker game.

At all events, in another moment the chips were clicking on the board table—science was forgotten for the more absorbing intricacies of poker.

Tubby, even then not realizing his marvelous gift, was left alone with his thoughts. Enormously large numbers whirled in his head—strange words—orbis, suns, planets, comets, stars . . . Stars! He seized upon that, as one

word at least, that was really familiar. It was a beautiful night out, he remembered; and as he gazed upward to the dim, smoky rafters of the room he was sorry he was not outdoors.

Tubby Discovers His "Wishing Power"

"**I** WISH I could see them stars now," he murmured.

And quite naturally, there were the stars, brilliant and glittering, spread out above him like millions of diamonds on a huge blue-velvet cloth. The moon

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*HERE is one of the most interesting interplanctarian and interstellar stories ever printed. If you are attracted by astronomy, and like to take your lessons in sugar-coated pills, here is a story that you will not soon forget. The narration, incidentally, is written in a lighter vein, with Mr. Cummings' indescribable good humor. For its breadth and completeness, this story easily commands one of the first rank positions in all interstellar space travel stories that have appeared in recent years. Mr. Cummings knows his science, and knows how to spin a most excellent yarn. You simply can not afford to pass this story by.*

---

hung over a clump of trees, above Bill Hawkins' apple orchard.

There are some very surprising things that occur so naturally they do not cause surprise. The revelation of Tubby's marvelous gift was one of them. He was not surprised to see the stars, only pleased.

"I *wish* I knew somethin' really true about them stars," he muttered thoughtfully. And then with sudden vehemence:

"I *wish* I knew all about them stars. I *wish* I knew all about Astronomy—I *wish* I could see it all for myself."

He felt fingers plucking at his sleeve, and turning, faced the dim figure of a man who was standing by his side.

"I came," said the man softly, "because you sent for me." He stepped forward a little, out of the shadow to a place where the moonlight fell on his face. Tubby thought he had never seen so sad a face before. It was long and very thin. It needed a shave, Tubby thought; and its eyes were unnaturally bright. A thin wisp of scraggly brown-white hair was above the face; and below, just above the collar of a soft white shirt, protruded a perfectly enormous Adam's apple.

Tubby's gaze swept the man's thin, but somehow muscular-looking figure—bareheaded, coatless, the white negligée shirt with loose, soft collar and a flowing black bow tie; and very baggy tweed trousers that flapped on bony legs.

"I'm here because you wanted me," the man repeated. His voice was deep and throaty, and inexpressively sad.

Tubby felt immediately sympathetic. "I'm sorry you're so sorry about somethin'," he said consolingly. "I didn't mean to send for you. I——"

The man smiled gently, pathetically. Tubby stared at his Adam's apple, fascinated, for it was bobbing up and down as though its owner were swallowing rapidly.

"Oh, I don't mind," the man said patiently. "*You* couldn't help it. You wished you knew all there was to know about Astronomy——" He paused, his voice trailing away.

"Right," said Tubby encouragingly. He felt somehow tremendously sad, but determined not to show it. "That's what I wished. And so you——"

"So, of course, because you have the power to make all your wishes come true, I had to hurry here to tell you everything you—wanted to know."

His voice broke; and Tubby saw, even in the dim moonlight, that his eyes were filling with tears.

"I'll tell you *all* about Astronomy," the man went on in his dull monotone. "But you won't believe me."

His utterly hopeless depression was contagious. Tubby swallowed the lump in his throat. He put out his hand and touched the man's elbow—a round, bony knob underneath the thin sleeve of his shirt.

"Yes, I will believe *you*," he said kindly. "I wouldn't never think you was a liar."

The man brightened perceptibly.

"Let's get acquainted," Tubby added. "Then you can tell me why you're so sad."

#### Professor Wells-Verne Introduces Himself

"MY name is Isaac Wells-Verne," said the man. "Sir Isaac Swift DeFoe Wells-Verne, but my friends call me Professor."

"Mine's Tubby—pleased to meet you, perffessor."

They shook hands.

"What are you perffessor of?" Tubby asked, after an awkward silence.

Sir Isaac's expression, which had cheered somewhat at the introduction, clouded over again.

"Professor of Knowledge," he said sadly. "It is my business to know everything and to tell people about it—in writing."

"Oh," said Tubby.

"I do tell them——" Sir Isaac sighed heavily, and a tear slipped from one of his eyes and rolled down his lined face—lines of care, and of emaciation rather than age, for the man was not really old. "I *do* tell them—but nobody ever believes me. Life and people on the moon, for instance——" He sighed again: and shrugged resignedly. "I've told them all about that and they don't take me seriously. They think because I've never been there, that I'm making it up. Sometimes they won't even buy what I've written. They——"

Tubby's fat little arm went around Sir Isaac's thin waist.

"Don't you care, perffessor. I'll believe you. I won't never think you're makin' nothin' up." A sudden thought occurred to him. "You're hungry, ain't you, perffessor? You *look* hungry. Did you eat today?"

"I—no, I didn't," Sir Isaac admitted reluctantly. "But I don't care about eating. I want people to appreciate my genius. I——"

"You *must* eat," declared Tubby. He expanded his stomach. "Look at *me*—I ain't never missed a meal in ten years."

The further thought struck him that possibly Sir Isaac had no money with which to buy food. McGuirk's lunch-wagon was less than a mile away—Tubby himself would pay for the meal. And then, as a climax to this mental activity, Tubby remembered his own newly discovered power.

"I wish we had a *abso-lute-ly* perfect dinner served right now, here on the ground," he declaimed abruptly.

And, even before Tubby himself realized his wish had come true, Sir Isaac was squatting cross-legged on the ground eating the food with avidity. Tubby had eaten only an hour before, and with difficulty he crammed down barely a third of the lavish meal. But Sir Isaac was equal to his task; and, for ten minutes, Tubby completely satiated, sat in silence watching his new friend empty the huge silver platters. Tubby noticed now that from the pockets of Sir Isaac's shirt the stubs of three or four grubby lead pencils and a fountain pen protruded; and that the third finger of his right hand had a corn on it, near the end joint; and all his fingers were ink-stained. Also from each of his hip pockets, as he sat hunched forward on the ground, Tubby could see a huge bundle of folded manuscript, sticking out.

When everything edible was completely eaten, Sir Isaac sighed contentedly.

"I wish we each had a good cigar," said Tubby promptly; and striking a match deftly with his thumb nail, he courteously lighted the huge black perfecto which Sir Isaac had in his mouth.

With his own cigar lighted, Tubby leaned back luxuriously and smiled at his companion.

"This ain't so bad," he declared cheerfully. "Now, perffessor, tell me all about *everything*. You can be-

gin with—" He deliberated. "—begin with the edge of Space. These here guys—"

Tubby broke off, for a stupendous idea had just occurred to him. Sir Isaac knew all about everything—but he had not actually seen it. The Moon, for instance. He had never been there—that's why people wouldn't believe what he wrote about it. Now with his (Tubby's) ability to wish for anything, why not go there—go everywhere—and see *everything*? It ought to be possible . . .

"Listen, perffessor," he said, excitedly. "You don't need to tell me nothin'. Let's go see things for ourselves." He explained his idea vehemently.

Sir Isaac looked almost dazed for an instant. "If I only could," he said musingly, his deep voice filled with awe. "I know just what we would find—on the Moon, Venus, Mercury, Mars—everywhere, everything—I know it all. If only I *could* verify it—could see it all for myself—"

Tubby was standing up impatiently. "Come on, perffessor. Let's go."

Sir Isaac climbed to his feet mechanically, a look of exaltation on his face.

"If only I could—" he murmured; but Tubby interrupted him sharply.

"Come on. Don't be no goop."

"But where? How?" asked Sir Isaac almost stupidly, for the anticipatory joy in his heart had dulled momentarily even his gigantic intellect.

"I *wish* we could go anywhere in the Universe. I *wish* we were all ready to go now. I wish we had a—a abso-lute-ly perfect automobile an' house to go in," Tubby intoned rapidly.

### The Interplanetary Space Flier Appears

THEY both saw it the same instant, shining in the moonlight in a field not fifty feet away—a pale, grey-white, square metallic object, as large as the little building that housed O'Conner's Grocery.

"There it is," said Tubby. "What is it? Come on—let's go see."

Sir Isaac's eyes shone as he looked at it.

"My Inter-planetary vehicle," he murmured, pride and awe mingling in his tone. Without another word he gripped Tubby by the hand, jerking him forward at a run.

Tubby's breath was almost gone when they arrived. He stood leaning against the side of the vehicle, panting. The thing was indeed as big as a very small cottage. It was made of a metallic substance—similar to aluminum only different, Sir Isaac said. In shape it was like a huge cube with a little dome set on top. It had several tiny windows of heavy plate glass set in each side, with a small metal door in front, which door now stood invitingly open.

Tubby, his breath recovered, walked around the vehicle, inspecting it curiously; while Sir Isaac stood regarding it as a proud mother might regard her precious offspring.

After a complete circuit outside, Tubby peered through the doorway into a dim interior.

"Come on in, perffessor. It's all ready, waitin' for us."

They went inside together; and Sir Isaac, as though he had lived in the place all his life, immediately switched on a light.

Inside, the vehicle was divided into several tiny rooms on two floors—just like a toy cottage, Tubby thought—and seemed fully furnished and equipped

ready for occupancy. There was a store-room of food—a little kitchen, like the kitchen of a Pullman dining car—a main room, filled with a mass of scientific instruments—and two very small bed rooms upstairs. Tubby sat down on one of the beds tentatively. Its mattress was soft; its springs yielding but strong, and its coverings luxurious.

Tubby sighed with relief. "I ain't no kicker, perffessor, but I do like to sleep comfortable."

They went back into the instrument room, where Sir Isaac quietly inspected a little keyboard like that of a typewriter.

"What's that?" Tubby asked. "Do you know how to run this thing, perffessor?"

Sir Isaac straightened. His manner had completely changed. He was now forceful, commanding, dominant. Tubby was impressed by his look, even before he spoke.

"This is *my* Inter-planetary vehicle," he said sternly. "I invented it—I designed it—I have operated it, in my mind, many times. It is one of the most important of my contributions to science. I know *all* about it, of course."

"Oh," said Tubby. "That's fine. Then we're all ready to start, ain't we?"

Sir Isaac bowed gravely.

Tubby at the moment was standing beside one of the little windows. The moon was still over Bill Hawkins' apple orchard; and at the sight two ideas came to Tubby simultaneously.

"Just a minute, perffessor." Sir Isaac was about to close the heavy front door. "I ain't goin' 'til I wish them apples of Bill Hawkins' is lyin' rotten on the ground. He's a mean guy, he is—wouldn't let me pick none *ever*."

Tubby's eyes were sparkling with vindictive joy at the thought of this simple and efficacious revenge. "Come on, perffessor. Let's go see how all them apples look when they're rotten."

Sir Isaac's glance was scornful.

"That is childish," he said shortly; and banged the door shut.

Tubby, subdued but still wishing fervently and audibly that this catastrophe would befall the luckless Bill Hawkins, stood by the window while Sir Isaac went to the keyboard and unhesitatingly pressed one of its keys.

There was a faint but perceptible trembling of the room. Tubby's feet pressed hard against the floor and his stomach seemed falling. It was like an elevator that suddenly takes you up much too fast.

### The Professor and Tubby Leave the Earth

SIR ISAAC switched off the light, plunging the room in darkness. Through the window Tubby saw a moonlight landscape silently dropping away beneath them.

He turned from the window after an instant, slightly sick and very frightened; but at once he felt better. The purring had ceased. The room, in fact, was apparently motionless and quite silent. Tubby felt no further desire to look out of the window; he sat down in a chair, mopping the perspiration from his forehead with his shirtsleeve.

Sir Isaac, his tall thin figure barely visible in the moonlit room, was still standing rigid by the keyboard, his fingers pressed delicately but firmly on its keys as a surgeon's assistant holds the patient's pulse

during an operation. Tubby stared at him a moment, then ventured:

"Where—where we goin', perfessor?"

Sir Isaac moved, and as his fingers left the keyboard to itself, Tubby's heart leaped. Would the thing fall if you didn't watch it? Evidently not, for Sir Isaac went over to the window quite calmly.

"We will not bother with the moon just now," he said thoughtfully, more to himself than to Tubby. "No, we can stop there coming home. . . . I think we should go toward the sun first, and then, after Venus and Mercury, skip back to Mars and so on out. . . . Yes, that will be best."

He turned away from the window toward Tubby.

"Our first stop will be Venus," he added authoritatively.

"Venus!" exclaimed Tubby. "That's fine. Then—then where do we go?"

"After that," said Sir Isaac slowly and impressively—"after that we will inspect the entire Universe!"

## CHAPTER II

### Tubby and Sir Isaac Pass the Moon, and are Fairly on Their Way to Venus

"COME over here, Tubby," said Sir Isaac a few moments later. He had gone back to the keyboard, pressed another of its keys after making a rapid mathematical calculation with one of his pencil stubs on a little paper tablet, and now was standing quietly by the window again. "Come here, Tubby, and look out."

Tubby shook his head emphatically. "You look out. I ain't interested."

He was considerably more frightened now than a few moments before, for a very disconcerting thing had happened. He had secretly been reassured as they started, by the knowledge that in the event of any dire disaster, he could easily wish himself safely back at home. It had been getting extremely warm in the room, and he had wished it would be cooler. But, so far as he could tell, it was getting warmer, rather than cooler. Alarmed, he had wished vehemently that they were back on Earth looking at Bill Hawkins' apples. But nothing had happened. Sir Isaac was then making his mathematical computations at the keyboard; finally he had pressed another key carefully, and quite in defiance of Tubby's frantic mental wishes, walked quietly to the window.

Tubby considered the situation, and now decided to consult his companion about it.

Sir Isaac laughed softly.

"That was merely your *Earthly* power," he said condescendingly. "I suppose I am glad you possessed it, since you were enabled to bring into material being this inter-planetary vehicle of mine." He raised his hand deprecatingly. "Of course, I could easily have constructed it myself. In fact, I was intending to—as soon as I had the necessary money."

Tubby was aggrieved at this ingratitude. "An' then I—I ain't able to wish for nothin' no more?"

"No," said Sir Isaac. "Naturally not—since you have left the Earth. You are now in the realms of Science—subject only to rational scientific laws. That magical wishing ability you had was childish. I could never be concerned in an affair like that."

He seemed to shudder at the thought, and added emphatically:

"I am a man of Science. Everything I have ever conceived has been strictly scientific. I am ashamed of you—and of course, now that you are in *my* realm, naturally all such foolishness has been left behind."

Tubby pondered this, sitting hunched up in his chair and sweltering in the heat. He was somewhat sullen; but presently, when Sir Isaac patted him kindly on the shoulder and assured him they were in no great danger, he cheered up a little.

"It's too hot in here, perfessor," he declared. "Can't we open the window an' get a little air in?"

Sir Isaac smiled at the idea. "There is no air outside," he said quietly. "We have already traversed the few hundred miles of atmospheric envelope and passed beyond even the most rarefied strata of the Earth's atmosphere. We are now in space."

"Oh," said Tubby. "Well, just as you say. But it's awful hot."

Sir Isaac was bending down to squint upward through the window, which from where Tubby was sitting was merely a black rectangle.

"It will cool off presently," he said casually. "There's the thermometer by you. See what it says."

The room was now dimly lighted by one small electric bulb—which was lucky, Tubby thought, for there was not even moonlight coming in through the window. He found the thermometer. It stood a little over a hundred degrees.

An alarming idea came to Tubby; it would be terrible to smother and be so hot all at the same time. "Say, perfessor, how are we goin' to breathe when we use up all the air we got in here?"

Sir Isaac reluctantly turned from his inspection of whatever it was showed through the window, and pointed to one of the instruments on a table over against the wall.

"In breathing," he explained, "we alter the air only in so far as we use up its oxygen and add to it an excess of carbonic acid gas. Now over there on that table is Reiset and Regnault's apparatus—which I still consider the best of its kind. It produces oxygen from chlorate of potassium and releases it into the air as fast as we use it."

Sir Isaac smiled to himself with satisfaction. "I have thought of and provided for every contingency. The carbonic acid gas that we exhale is absorbed." He indicated several containers under the table. "Those hold caustic potash, which absorbs the carbonic acid gas. . . . I have explained all this in my books, but I suppose you have not read them."

"Yes—no," said Tubby. "Not all of them, I guess." He felt a little humiliated. "I ain't so very scientific, perfessor. You'll have to tell me things as we go along."

"I will," agreed Sir Isaac magnanimously. He pulled out his handkerchief and mopped his forehead. "It is hot. That's because of our friction in going through the Earth's atmosphere so fast. We're far beyond the atmosphere now—exposed to the intense cold of inter-planetary space. We'll be freezing in a little while—you need not worry about the heat."

Tubby glanced apprehensively toward his discarded coat, and tried to recall how many blankets there were on the bed upstairs.

Sir Isaac added:

"Come over here and look out the window. Don't be afraid."

Through the window Tubby saw the stars, brighter, more brilliant than they had ever been before. Freed now from the distortion of the Earth's atmosphere, they glittered like huge, sparkling diamonds, surrounded, not by the familiar blue of the sky as seen from the Earth, but by a profound inky darkness.

It was a marvelous—indeed a stupendous—sight. The whole extent of the heavens swarmed with stars and constellations of pristine purity. Here and there hung huge, spiral nebulous masses, fleecy white, and glittering with tiny blazing points of white fire. Some of the larger stars were blue-white, others silver, still others a dull glowing red; and across the firmament stretched that immense ring formed by an impalpable dust of stars, the "Milky Way," in the midst of which our own sun ranks only as a star of the fourth magnitude.

"Ain't all that pretty?" Tubby marveled. His fear had entirely gone. "Where's the moon?"

"The moon is on the other side of us," answered Sir Isaac. "It is shining into the room next to this." The instrument room, in which they were, only extended half the width of the vehicle. "Looking out this window we cannot see the moonlight, for there is no atmosphere to diffuse its rays. . . . Stoop down and look upwards, Tubby."

Tubby squinted up through the window from beneath and saw a very large, thin silver crescent—an enormous arch extending nearly a third of the way across the sky. It glowed with a blue, almost phosphorescent light, and its outlines were blurred and wavy. Some parts of it were brighter than others, and there were many dark, almost black spots.

### The Earth Seen From Space

"WHAT'S that?" he asked, amazed. "I ain't never seen nothin' like that in the sky before. Is that where we're goin' to? We must be almost there. What is it? Venus?"

"That's the Earth," said Sir Isaac calmly. "We have turned over, you see, because our base is heavier. We are falling diagonally away from the Earth, partly toward the moon and partly toward the sun. I shall head directly for the sun later tonight."

It was very hard for Tubby to realize that they were going the other way, having turned almost completely over; but finally he managed it. He was beginning to feel comparatively little surprise at anything any more.

"Why don't we see all of the Earth?" he demanded. "Why is it so thin—like a new moon?"

"Because the Earth is 'new,'" Sir Isaac explained. "From the position we now occupy that is all that is illuminated by the sun's rays, though if you look closely you can distinguish the dim outline of the unilluminated portion of the sphere. You see the Earth is in its first phase. It—" He seemed contemplating the use of some profound scientific language; then, meeting Tubby's puzzled glance, he shrugged and gave it up.

"It is just like a new moon," he added. "Only it's a new Earth."

They inspected the moon itself a few moments later, through the window of the adjoining room. It hung apparently motionless just below the level of

the window. All around it in the blackness, the stars shone as brightly as though it were not there—which, as Sir Isaac reminded, was merely because there was no intervening atmosphere to diffuse its rays and thus obscure the stars.

The moon was somewhat larger than when seen from the Earth, and considerably brighter. Its rays bathed the store-room with a brilliant, blue-white light. Tubby was opening a box of crackers as he stood regarding it.

"Ain't that romantic," he murmured a moment later, with his mouth full of biscuit. "That's absolute-ly pretty moonlight. Come on, perfessor—eat somethin'. This travelin' so fast makes me hungry."

They made a very comfortable little midnight supper of sardines—which Tubby found in a well-filled ice box—and the crackers. Sir Isaac's appetite revived with eating, and he devoured such a prodigious quantity of the food that Tubby became alarmed over an ultimate shortage.

"It's quite all right, you know," Sir Isaac assured him. "We are supplied for over a year. I've never started on a journey like this—even a mental journey—without an entirely adequate food supply. Besides, we can replenish along the way. You will find the Mercurian cuisine particularly good."

It had been growing steadily colder; and Tubby, discovering that the tiny kitchen which adjoined the store-room held a very decent little gas stove, made them each a steaming hot cup of coffee.

"How cold is it liable to get, perfessor?" he asked, as they sat at an immaculately clean board table and drank the coffee. "Ain't this house got any heatin' apparatus? A nice little furnace now—"

"It can be heated," Sir Isaac answered. "But we shall not need it. It will be warm enough presently."

Certainly the weather in space was exceedingly changeable; but that was to be expected when one was traveling from place to place with such rapidity.

"But how cold would it get if we stayed where we are?" Tubby persisted. He was beginning to be theoretical also, which, as Sir Isaac had remarked, is the first prerequisite of a scientific mind.

"I think I once estimated the temperature of space to be about 250 degrees Fahrenheit below zero," remarked Sir Isaac. "Pass me the cream, will you? And the coffee pot? You make pretty good coffee."

"Thanks," said Tubby. "I ain't so terrible good at cookin'—" He paused deprecating, his amazement at Sir Isaac's estimation at how cold it could get forgotten in the compliment to his culinary skill.

"Minus two hundred and fifty degrees," Sir Isaac repeated thoughtfully. "I wish I could verify it now. But we won't suffer from the cold. Soon we shall be—"

As though in answer to his unspoken words, sunlight burst in through a window in the floor directly under Tubby's feet. He had not known this window was there, and leaped aside in terror. The vehicle at that moment had emerged from the conical shadow cast by the Earth, and the diagonal rays of the sun struck its lower surface. Bathed in its golden fire, which mingled with the moonlight from the side window, the room in a moment became warm and pleasant.

"This is nice," said Tubby, with rapidly recovered equanimity. He discarded his coat again, and pushed the hot coffee from him. "We sure do have speedy changes of weather, don't we, perfessor?"



Sir Isaac had donned a pair of smoked spectacles and was on his knees peering down through the window. He called Tubby and offered him a second pair of the glasses.

Tubby sat down on the floor. The sun, through the smoked glass, appeared a glowing red ball, with enormous tongues of flame rising from it. The globe itself was no larger than usual. They were closer to it, Sir Isaac remarked, but its distance still was so comparatively great that its visual increase of diameter was undiscernable. Also, on Earth, the atmospheric refraction enlarged it.

The sun was not directly beneath them, but off considerably to one side—on the side away from the moon. And although Sir Isaac had already explained the phenomenon in the case of the moon, Tubby was greatly amazed to see the stars shining quite imperturbably all around the sun.

"That's the first time I ever seen stars shinin' in the daytime," he murmured.

Sir Isaac climbed to his feet. "I'll be back in a moment. I want to change our course and put on more speed."

He left Tubby sitting there and went into the instrument room, where, after a few more algebraic calculations, and careful reference to a huge book that lay at hand, he depressed another of the keys slightly—and, after an instant's hesitation, two others on another rank of the keyboard.

Tubby, squatting on the floor in the other room, saw the sun and all the stars swing slowly over to one side—the whole firmament shifting silently under him. The sun was directly underneath when the movement ceased. Looking over to the side window he saw that the moon had risen considerably. It was now so high he could only see it because he was down on the floor.

Sir Isaac returned.

"We'll make good speed now," he said. "We're headed directly toward the sun, with eleven and a half times our former velocity." He sat down beside Tubby on the floor.

It was amazing to stare down through that window at the sun and stars—into the immensity of space directly under them—and to realize that they were falling into it. Yet Tubby was not alarmed, possibly because the vehicle felt so stable, so vibrationless, so absolutely silent and motionless. There had not been the slightest perceptible movement since that first instant when they started. In changing their course it was the stars and sun that appeared to move, not the vehicle.

Tubby pondered all this. "Why don't we feel like we was movin', perffessor?" he demanded some minutes later. "If we're goin' so fast—"

"My dear fellow," Sir Isaac answered, "you must realize that all motion is relative. There is no such thing as absolute motion—it all depends upon your immediate surroundings. Einstein might tell you that as something very new—yet I have always known it."

"I don't get you," said Tubby, puzzled.

"The Earth," said Sir Isaac, "is flying through space at the rate of some 66,000 miles an hour. You never felt that motion, did you? But when you are in a train going 60 miles an hour—that motion you do perceive. That is because, relative to your immediate surroundings, you are moving that fast. Do you understand now?"

"No—yes," said Tubby. "I guess so. Show me Venus. When do we get there?"

Venus, which fortunately was approaching inferior conjunction—that point in its orbit when it is between the Earth and the sun—was discernible slightly to one side of the sun at a visual distance of about twice the sun's diameter. Tubby saw it as a very large, bright, blue-white star.

"A telescope would show it as a crescent in its last phase," said Sir Isaac.

Tubby, with their first stop in such plain view directly beneath them, was intensely interested. "Tell me all about Venus," he demanded. "An' tell me how you run this—this inter-planetary house we're in, so you can make it go where you want to."

Sir Isaac glanced at his watch. "Twelve fourteen. You must get some sleep soon. I will explain the operation of my vehicle tomorrow."

Tubby realized he *was* a little sleepy. "How long we been travelin'?" he asked.

"Two hours and twenty-seven minutes." Sir Isaac pulled out a lead pencil and a little slip of paper and began a rapid calculation.

"We are now about 947,000 miles from the Earth," he announced.

"In two hours an' a half! That's some travelin'."

Sir Isaac smiled. "I should not say that—however, it is quite satisfactory. I started very cautiously. We went through the Earth's atmosphere considerably less than one one-hundredth that fast. I increased our velocity soon after that—and just now, when I altered our course, I increased it again eleven and a half times."

#### Some Facts About Venus

"GO on," said Tubby. "Tell me more. Tell me about Venus."

"Venus," began Sir Isaac, "is a globe very little smaller and of very slightly less density than our Earth. Its mass, hence, is only a little less—gravity on its surface being .88 that of the gravity on the Earth. . . . Do you follow me? I'm only talking in round numbers, of course."

"Of course," Tubby agreed. "Go on."

"It revolves on its axis once in 23 hours, 4 minutes and 19¾ seconds. Those are my figures, you understand—they are quite exact. Therefore, its day is very similar in length to our own. Its orbit lies about 67 million miles from the sun—some parts of it further, some nearer. The Earth, you know, revolves at a mean distance of about 93 million miles from the sun. Venus makes one complete revolution around the sun in a little more than 224 days—hence its year is that long—about a third shorter than ours. Venus has seasons just as we have—only less marked. Its atmosphere is a little denser than ours, but altogether Venus is more like the Earth than any other of the planets."

"Good," said Tubby. "Go on."

"It has no satellite," Sir Isaac added as an afterthought.

"What's a satellite?"

"A satellite is a smaller body revolving about a planet, just as a planet revolves around the sun. The moon is the Earth's satellite. It revolves around the Earth about once a month."

"How far away?" Tubby demanded.

"Oh, very close. Only about a quarter of a million miles. We are already four times that far

from the Earth. You can see how close the moon and Earth are together now. Look!"

Sir Isaac pointed to the side window, pulling Tubby over on the floor nearer to it. The moon had risen still further, and had dwindled greatly in size. The tip of the Earth, very much smaller than before and more silvery, showed in the upper corner of the window.

"Why, they're gettin' right together," Tubby exclaimed. "That moon really belongs to us, don't he? He's our little brother!"

"Yes," said Sir Isaac. "We'll stop off there going home. Now about our present velocity. Venus, at the time we started, was about 31 million miles from the Earth. We have already gone about one million, at an average rate of some four hundred thousand miles an hour. I have now increased this velocity to four million, six hundred thousand miles per hour."

Sir Isaac looked a little worried as he named these figures. "I hope we don't hit anything," he added anxiously.

"Hit anything!" Tubby echoed. He glanced down through the window at the heavens beneath. "Ain't we got plenty of room? It looks like we had plenty."

Sir Isaac sighed. "All space is relative to motion. We *haven't* very much room at this velocity. It's so crowded in here near the sun. Outside—particularly beyond Neptune—things will be different. Then I can really put on speed."

He shrugged. "You go to bed, Tubby. I'll watch here. I don't fancy we're in any great danger."

"Right," said Tubby. "If you see anything comin' you steer around it." He got to his feet. "Good night, perfessor. I'm goin' upstairs right away. When do we land at Venus?"

Sir Isaac was again absorbed with his mathematics, the sunlight from below lighting with strange outlines his lanky figure and earnest, intellectual face.

"What?" he asked abstractedly.

Tubby meekly repeated his question.

"I shall alter our course later tonight," said Sir Isaac. "I am using the sun's attraction now. It's a little longer route, but simpler. Later I shall head directly for Venus and slow down somewhat."

He added:

"I'll call you about six o'clock. We will be fairly close in by then. We'll land shortly after breakfast. . . . Good night."

"Good night, perfessor. Don't make no mistakes with them figures, will you?"

He turned, and climbing to the floor above, carefully selected the better of the two beds and soon was snoring heavily.

### CHAPTER III

#### In Which Tubby and Sir Isaac Meet the Venus-Girl and Learn of the Plot to Destroy the Earth

TUBBY had gone to sleep in the starlight and very dim moonlight. He awoke most uncomfortably warm, to find the glaring sunlight beating directly on his bed through the bedroom window. For a moment he did not know where he was. The sun, larger than he had ever seen it before, was about level with the window—shining among the stars in the black sky, intolerably bright, excessively hot. He lay blinking and gasping; then with returning memory, he leaped out of bed and jerked down the green roller shade.

The vehicle was without vibration, silent as before. The room was hotter than midsummer. Where was the professor? Was anything wrong? What time was it?

"Oh-h, perfessor!" Tubby bellowed.

Sir Isaac's voice answered him from below.

"Oh, you're awake, are you? Come on down. Dress as coolly as possible."

Tubby was dressed in a few moments, putting on his thinnest clothes—white flannel trousers, white buckskin shoes and white negligee shirt—which he had found in the bureau drawers and the wardrobe. He was glad to find them there, and glad that they fitted him so perfectly, for he wanted to look his best when arriving on Venus.

When he got downstairs he found Sir Isaac also dressed all in white, with his shirt sleeves rolled up and his shirt open at the throat exposing half his bony but broad chest. Around his forehead was tied a white silk handkerchief to keep the hair out of his eyes. He was sitting at the instrument room table, working at his interminable figures.

The side window of the room, which was now turned away from the sun, showed only the black void of space with its glittering stars. Through another window, in the floor directly under Sir Isaac's feet—which Tubby had not known to be there since it had been covered the night before—a soft, pale-blue light was streaming. It flooded the entire room, more intense than moonlight, but blue rather than silvery.

Sir Isaac looked up from his calculations and smiled.

"Good morning. I was just coming up to call you."

"The sun woke me up," said Tubby. "It's awful hot up there. . . . It ain't so cool down here either. . . . What's that blue light from? How are we getting on? What time is it?"

Sir Isaac laid down his pencil reluctantly.

"Seven thirty-three," he said. "You've had a good long sleep. I just altered our course again. We intersected the orbit of Venus twenty-seven minutes ago, so I thought I had better turn and head directly for her. That's why the sun swung up to your window."

Tubby hung his natty Panama hat on a rack and approached Sir Isaac.

"What's that blue light? Venus?"

Looking down through the window, Tubby saw directly beneath them an enormous blue half moon, with dark, irregular patches all over it. Against the black background of space it glowed with intense purity—its pale-blue light making it seem ethereal—unreal.

"That is Venus," said Sir Isaac softly. "You can see the whole of the sphere when your eyes become accustomed to the light."

A moment more and Tubby saw the dark, unilluminated portion. He saw, too, that where the edge of the light crossed the face of the globe it was not a continuous line, but was broken into many bright spots and patches of darkness.

"That's where the sun strikes the tops of the mountains," Sir Isaac explained. "The dark places are valleys and plains. . . . Let us have breakfast. Aren't you hungry?"

"No—yes, sure I am." Tubby rose to his feet from where he had been kneeling heavily on the

floor. "That Venus is awful pretty. How far away is she? When do we get there?"

"We intersected her orbit at a point 1,142,606 miles away, roughly speaking," Sir Isaac replied. "I had to change our velocity once or twice during the night—but still I fancy I may say we have done fairly well." Sir Isaac drawled this out complacently. He was, indeed, very English at times.

"I ain't got nothin' to complain of," Tubby agreed. "When do we land?"

"Our present velocity is only 575,001 miles per hour. Venus is coming toward us at the rate of some 68,000 miles per hour. . . ." Sir Isaac seemed to be calculating in his head. ". . . But allowing time for landing—we shall have to slow up much more a little later on, you know—well, I think we should be there by ten-thirty or eleven o'clock this morning."

"Very good," said Tubby briskly. "Come on. Let's eat."

They had bacon and eggs for breakfast, and iced coffee with whipped cream, because it was too hot for regular coffee. Tubby would have made pancakes, but there did not seem to be any maple syrup, at which he was exceedingly annoyed. Several times during the meal Sir Isaac went into the instrument room for a moment to make a brisk calculation, to verify their course and to decrease their velocity a little.

Tubby's questions about Venus were incessant at first; but as Sir Isaac said, why discuss it theoretically when they were to see it so soon?

The store-room, which they were using as a dining room because it adjoined the kitchen, was directly under Tubby's bedroom. The sun hung level with its window, but they kept the shade closely drawn. After breakfast they returned to the instrument room, Tubby insisting he would not wash up the dishes so soon after eating; and Sir Isaac showed him the Earth. It was about level with the instrument room side window and thus almost exactly opposite the sun. So far as Tubby could see it was a star no different from any of the rest of them, except possibly a little larger. The moon, of course, was invisible.

Venus, through the window beneath their feet, had grown very much larger during breakfast. It was now an enormous glowing ball, half dark, half light, apparently nailed fast to the black surface of the firmament. The sensation that they were high above it and falling directly down to its surface came to Tubby suddenly. It made him a little giddy at first; but the unpleasant feeling soon passed away.

For nearly an hour they sat talking idly, while this glowing sphere beneath them grew steadily in apparent size. They could distinguish even its dark portion quite clearly now, and its convexity was unmistakable. There were hardly more than 25,000 miles above its surface, and falling slightly toward its northern hemisphere, when Sir Isaac suggested that Tubby wash up the breakfast dishes.

"I shall go down through the atmosphere very slowly," he said. "But still I think we shall be there in rather more than an hour."

Tubby hastened into the kitchen, and Sir Isaac, pencil and pad in hand, took his station at the keyboard. When Tubby finally returned the instrument room was considerably darker than before. Sir Isaac, with two small electric bulbs lighted, was still seated at the keyboard.

"Say," began Tubby indignantly, "the sun went behind a cloud or somethin'. I ain't quite finished, but I don't know how to light the lights."

They had already entered the atmosphere of Venus, and had encountered, as chance would have it, a heavy bank of clouds—heavier than clouds ever are in the atmosphere of the earth. The sun thus obscured, the interior of the vehicle had grown quite dark.

"Never mind," said Sir Isaac. "Let it go. We'll be there very shortly."

Tubby located his Panama hat, rolled down his sleeves, and donning a thin blue serge jacket sat down to await their landing. He could see nothing but grey mist through either window for a time; then, as they burst through the clouds, the room suddenly brightened.

Sir Isaac bent over the window in the floor, calling to Tubby. Beneath, spread out in a vast panorama extending to the horizon in every direction, lay the landscape of Venus—forests of green vegetation; a thin silvery ribbon of water; tiny grey blobs that were cities; and in the distance a range of blue-green mountains with heavy white masses of clouds above. And, curiously enough, by a familiar optical illusion, it seemed now a concave surface, as though they were hanging over the center of a huge shallow bowl, with the horizon rising upward to form its circular rim.

"My!" exclaimed Tubby. "Ain't that pretty? Just like bein' in a airplane, ain't it perfessor?"

Sir Isaac, hovering anxiously between the floor window and the keyboard, was now exceedingly busy.

"I've got to select a landing place," he said. "If you see a large open space where there are no trees, tell me at once."

Tubby, forgetting the possible damage to his white trousers, sat down on the floor beside the window, peering intently downward. They were falling rapidly; the landscape grew momentarily larger in detail, passing slowly to one side as they fell diagonally upon it.

The instrument room was now hotter than ever before. Tubby took off his hat and coat again, and dashed the dripping perspiration from his face.

"Hey, perfessor, slow up a little," he called to Sir Isaac at the keyboard. "We're gettin' pretty close."

They were now at an altitude of hardly three thousand feet. The circular horizon had already risen so that the range of mountains in the distance was visible through the side window. It was a beautiful day outside—subdued rays of sunlight filtering through the white cloud masses and falling upon the vivid green countryside in brilliant patches of light.

They passed over the narrow river, and Tubby saw an open space surrounded by tremendous forests of tangled green vegetation, with occasional white blobs that might have been houses. Beyond, perhaps five miles distant, a city lay—its low stone buildings gleaming a dazzling white.

When they were directly over the open space, Sir Isaac depressed another key sharply; and the vehicle began falling vertically downward, with constantly decreasing velocity, until, when they were only a few hundred feet up, it seemed floating gently down rather than falling.

Sir Isaac's eyes were now glued to the window, his

fingers resting lightly on the keys. Tubby stood up and put on his coat again; and a moment later, with scarcely a perceptible jar, they landed on the surface of Venus.

Sir Isaac relaxed, his face radiating triumph.

"We have landed," he cried exultantly. "A perfect trip, my dear fellow—12 hours, 14 minutes and 7 seconds elapsed time!"

"Right," said Tubby. "We're here. Come on professor, let's go outside an' get some air."

"What's that?" Tubby exclaimed abruptly. "Don't you hear somethin', professor?"

Music was wafting to them on the breeze—soft, liquid tones like the music of a harp, and the sweet, pure voice of a girl singing.

"It's over there," Tubby half whispered. "Over in the banana trees. Come on—let's go see."

They crept quietly forward; and within the grove of trees came upon a tan-bark path. As they followed it the music grew steadily louder, until nestling under the huge spread of banana leaves they saw a little white marble pavilion, with a tiny splashing fountain before it. The figure of a girl in white reclined beside the fountain—a girl who was apparently alone, playing on a small harp-like instrument and singing to its accompaniment.

"Hello-o!" Tubby called incautiously.

The girl sprang erect; and stood trembling, lyre in hand, as they hurried forward. Tubby saw she was a rather small, very slim girl, dressed in a flowing white garment from shoulder to knee, which was gathered at the waist with a golden cord whose tasseled ends hung down her side.

"Good morning, ma'am," he said graciously. "It's a nice day, ain't it?"

The girl smiled, seemingly reassured by his greeting.

"We trust you speak our language," Sir Isaac added anxiously. "It has always been my theory that on Venus——"

The girl replied in a gentle, softly musical voice:

"I speak the language of the North Country of Venus, sir."

Her fear seemed to have left her. She stood, with dignified bearing, waiting for them to explain their presence.

Sir Isaac, with infinite relief on his face, turned to Tubby. "You see? I am vindicated. I always knew that on Venus—particularly in the North Country—the language was——"

Tubby frowned. "My name's Tubby," he said to the girl. "An' my friend's name is——"

"Sir Isaac Swift DeFoe Wells-Verne," stated Sir Isaac impressively. "We are charmed to meet you, Miss——"

"I am called Ameena," said the girl, simply; she extended her hand in most friendly fashion.

When they had all shaken hands, she added:

"You are not of my world, surely. We so seldom have visitors here, I cannot tell——"

"We're from the earth," said Tubby promptly. "We just got in this mornin'."

"The earth!" Ameena exclaimed. She seemed suddenly perturbed. "I had thought you were Mercurians—men of the Light Country perhaps. We have never had earth-men here before. Never have I seen——"

"No," said Sir Isaac. "We are the first."

The girl had seated herself on the marble rim of the fountain; her pretty little face was clouded over with anxiety.

"I am so glad you came," she said after a moment of silence. "Now I can warn you of the danger to your earth. My people are so indolent. The Martians are about to descend upon your earth and conquer it. Rebels from the Twilight Country of Mercury are their allies. Only last month they were here in Venus—emissaries asking our people to join with them." She shrugged. "We would not do that, of course. What is war to us? These Martians do not covet *our* world, for we have nothing—only our fruits and our wine, and our simple buildings, and our music and poetry—and love-making."

She added, "But your earth—that is different. Your world they desire. They——"

"Martians to conquer the earth!" Sir Isaac gasped, stupefied.

"They have gone to Jupiter also," Ameena went on. "When they found we would not join with them, then they said they would enlist help from the great Jovians themselves. I do not know if——"

"Oh, my gosh!" Tubby was almost speechless with fright.

"To conquer the earth!" Sir Isaac repeated. "When, Ameena? Only tell me when?"

She answered quietly, but with obvious agitation: "Already they have conquered your moon. Your poor Selenites could offer but little resistance, and a Martian outpost is established there. And the Twilight army of Mercury is already massed in readiness on Mars."

She paused; then added swiftly:

"At the next opposition of Mars with your earth—only two months off they say it is—then the Martians and their allies will descend in hordes upon you!"

## CHAPTER IV

### In Which Tubby Takes Command and A Fatal Catastrophe Is Imminent

**I**N TRUTH it was a drastic, desperate situation for their native earth of which the voyagers were thus unexpectedly informed. Even without his reference books, or the use of mathematics, Sir Isaac's well informed mind told him that they had no time to waste. Mars would reach opposition—that point in its orbit when it was nearest the earth—in just 57 days, 6 hours and 30 minutes from the present moment. Sir Isaac knew that. He also knew that if the miserable renegades of the Twilight Country of Mercury were allied to the Martians in an attack upon the earth, this attack, when it occurred, would be irresistible. And already the enemy had conquered the moon—occupied it—established there a hostile outpost barely 250,000 miles away!

Sir Isaac's stern, intellectual face was pale as he questioned the Venus-girl more closely. Tubby, when the details of this dastardly plot began to sink into his mind, spluttered with indignation.

"How dare them people attack our moon?" he demanded. "That ain't right. We never did nothing to them. What are we going to do about it, professor? We got to do something'."

Sir Isaac had seated himself beside Ameena on the fountain rim. He was trembling a little, and his thin lips were pressed tightly together.

"Yes," he said, struggling to keep a semblance of

composure in his voice. "Yes, you are right. We must do something. But what?"

"That's what I said—what?" Tubby prompted. "Go on, perffessor."

He had so forgotten Ameena's gracious beauty in the excitement of the moment that his hat was now jammed on the back of his head, and his fat little fists were clenched belligerently.

"It isn't the moon I'm worried over," Sir Isaac went on musingly. "That's a mere detail. It's the safety of our earth itself. If they land there in any strength at all we'll be annihilated in a day—every living being on the earth! Why with that Mercurian Light-ray—and with those great machine bodies to house the Martian Intelligence——" Sir Isaac broke off, overcome at the thought his words invoked. He recovered after a moment, however, and added to Tubby and the girl impartially:

"I fancy you have never read my books. I've told all about it in them."

Ameena shook her head; Tubby seemed embarrassed.

Sir Isaac obviously was disappointed. "Oh well, of course here on Venus they had no sale. It is immaterial. . . . This attack on our earth is too horrible—it is unthinkable. It must not be."

"No," agreed Ameena soberly. "It must not be. But what can we do to prevent it?"

"We?" exclaimed Sir Isaac. "You will help us?"

She held out her two hands simply; and Tubby and Sir Isaac impulsively grasped them.

"I could not let my cousins of the earth come to harm for lack of *my* help," she said quietly.

Sir Isaac, sentimental by nature, was again overcome with emotion; Tubby pressed the girl's hand warmly, beaming on her.

"That's fine, Ameena," he declared. "You are a regular girl, ain't you?"

There was a brief pause. Then Ameena said:

"I do not know if in Jupiter they are lending help to the Martians or not. But in the Light Country of Mercury I know they hate the Twilight People—these outlaw neighbors of theirs who are joining with the Martians. They of the Light Country, perhaps, would help us."

"The Light Country of Mercury!" Sir Isaac echoed. "By jove, how stupid of me! Of course! They, too, have the Light-ray. With one Light-ray we can fight the other!"

"Fine," agreed Tubby, still beaming at Ameena, who flashed prettily under his openly admiring gaze.

Sir Isaac stood up with determination. "Mercury is now fortunately approaching inferior conjunction with Venus. It is barely thirty million miles away from us at this present moment. Let us go to Mercury at once!"

"Come on!" cried Tubby enthusiastically. "Let's go. Let's aim to get there this afternoon—we can if we hurry." And clutching Ameena by the hand, he started off at a run through the giant banana grove, Sir Isaac following close behind.

After a hundred yards Tubby stopped abruptly, almost jerking Ameena off her feet.

"Say, listen, little girl—how about your family? Ain't your family liable to get scared, you runnin' out into space this way without sayin' nothing' to nobody?"

Sir Isaac also seemed worried by this thought, but the girl smiled readily. "I have heard about

your earth families," she said. "In Mercury they have them also. But here on Venus there is only the State and the Individual. At fourteen I was free from control of the State. I am my own mistress now." She raised her arms with a pretty gesture. "Even love has not come to me yet. I am free."

Sir Isaac was relieved. "Of course! Naturally. How stupid of me. I should have known that on Venus——"

"Great," said Tubby. "Come on then—let's get goin'." He started off again as fast as his fat legs would carry him.

They departed from the surface of Venus ten minutes later, hurtling up through the atmosphere at a velocity that heated the interior of the vehicle like an oven. Sir Isaac put its cooling system into operation at once—chemically cooled coils over which air was driven by electric fans and then circulated through the various rooms—after which, ignoring their guest, he seated himself at the instrument-room table and began a computation of their course to Mercury.

Tubby showed Ameena over the vehicle with enthusiasm. He had forgotten for the moment the dire portent of this new journey and was like a boy on a holiday. The girl was intensely interested in everything, especially in the marvelous, ever-changing aspect of her own world as they slowly turned over and dropped away from it.

"You can have all the upstairs to yourself," Tubby declared, with due regard for the conventionalities. They were standing then in the doorway of one of the dainty little chintz bedrooms. "The perffessor an' I'll bunk downstairs. He's a real nice guy, the perffessor—you'll like him."

"I'm sure I shall," Ameena said. Her eyes, glancing at Tubby sidewise, were veiled by their heavy black lashes. She added softly:

"And you, too, my friend Tubby."

Tubby did not quite realize it then, but, indeed, this Venus-girl, typical of her race, had a distinct talent for love-making.

When they came to the kitchen, Tubby was much embarrassed over the remains of the breakfast dishes. But Ameena proved herself a real housewife by immediately assuming charge of this department of the vehicle. She began washing the dishes at once—a curiously incongruous sight in her Greek-maiden robe as she bent over the kitchen sink!—while Tubby stood admiringly by, watching her.

When the kitchen and store-room were immaculate, Tubby and Ameena returned to the instrument room. The sun was shining up through the lower window; the vehicle was cooling off a trifle since leaving the atmosphere of Venus; they were now well launched into space.

Sir Isaac, having completed his computations, greeted them triumphantly.

"We have traveled 2,138 miles," he said. "I am heading directly for the sun now. I have been taking it very slowly until a moment ago."

"Very good," Tubby agreed, with a most business-like air for Ameena's benefit. "But we got to hurry from now on if we're goin' to get there today."

They sat down then to discuss the future. There was really very little to discuss, as a matter of fact, for Ameena's knowledge of war conditions throughout the solar system was very slight. What the

voyagers could do to protect the earth depended upon two factors. Had the great Jovians joined in this dastardly war? And would the Light-Country of Mercury lend its aid—its Light-rays and other weapons—for the earth's defense?

"Well," said Tubby, "we'll know pretty soon. What's the use arguin'? Ain't I right?"

Sir Isaac yawned involuntarily in spite of their interesting argument. He looked embarrassed.

"You're sleepy," exclaimed Tubby solicitously. He added to the girl:

"The pefessor ain't had a wink of sleep since we left the earth last night. He'd better go take a nap."

Sir Isaac was indeed tired out. "I must direct our flight," he said. "I cannot leave our course to—"

"Why can't you?" Tubby demanded. "I ast you twenty times already to show me how this here thing works. I can run it the same as you, if you show me how just once."

In the face of his growing fatigue which would not be denied, Sir Isaac was forced to yield.

"My inter-planetary vehicle operates upon a very simple principle," he began. "First you must know that the law of gravitation says that every body in the universe attracts every other body directly as the mass and inversely as the square of the distance between them."

Tubby and Ameena were all attention.

"We don't quite get you," Tubby said.

"Directly as the mass means that if one body weighs 100 tons and another weighs 10 tons, the big one will exert ten times the attractive force of the little one."

"That is very clear," said Ameena.

"Go on," nodded Tubby.

"And inversely as the square of the distance means that when bodies are twice as far apart they only exert one-fourth the attractive force upon each other. Thus you see every mass of matter in the universe is attracting every other mass according to those laws.

"Now each of the six faces of this vehicle—top, bottom, and the four sides—is lined with a metallic plate. This very curious metal is found principally on Mercury—although, as I have shown in my books, it has been prepared by one scientist on earth—he who went first to the moon. My projectile, fired from an enormous cannon, you remember, failed to reach the moon, but merely encircled it."

"I remember that other one," Tubby exclaimed.

Sir Isaac was pleased. "Yes. . . . That was where I explained my gravity screen. . . . Well, we are using now a device very much like that, only vastly more efficient. You see, in this particular inter-planetary vehicle I have a current something like the Mercurian Light-ray, and something like our own electricity. With it I charge any or all of these metallic plates both negatively or positively. I mean, I can make them *neutral* to gravity—so that gravity is cut off entirely as in the case of the gravity screen. Or I can make them *attractive*, or *repellent*. Without any charge, you understand, they are attractive, as all matter is. With my negative charge they repel with exactly the same force as normally they would attract."

"Ah," said Tubby.

Sir Isaac warmed to his task. "Let me explain to you the exact result of this. When we were resting

on the earth's surface, I cut off—only partially, for you see the change may be made with any rapidity desired—the gravity from our base. Having then an insufficient attraction from the earth to hold us there, we left its surface, flying off at a tangent because of the earth's rotation on its axis. . . . But I won't go into that. . . . Once in space, as we are now, I merely make one face attractive, and the others neutral or repellent. Thus the attractive face acts on whatever heavenly bodies lie in the direction, and we are drawn toward them. For greater speed I also use the repellent power of those bodies lying behind us. For instance, after leaving the earth, I used the attraction of the sun—only a portion of it, of course. Later, merely for experiment, I combined with that a fraction of the earth's repulsion. Early this morning, when we approached Venus, I used *her* attractive power, cutting off the sun completely."

Sir Isaac turned to the keyboard. It was quite similar to the keyboard of a very large typewriter—and with more keys. These keys were of three different colors—white, red and black—and all of them were numbered plainly.

"These keys," said Sir Isaac, "you will observe are on six banks—each bank governing a different face of the vehicle. For instance—" He indicated the lowest row of keys—"this bank governs our base. And this, the top of the vehicle—and these are the sides.

"There are, you notice, fifteen keys on each bank. When they are all up there is no action at all—the face allows any heavenly body to attract with its full, normal force. But, when I press down this red key—each bank has one, you see—then the face becomes neutral to gravity. The seven white keys give seven different intensities of attraction, and the seven black ones give seven different intensities of repulsion. A key pressed down stays down until you pull it up."

"Sure," agreed Tubby. "That ain't so awful complicated."

Sir Isaac went on:

"You will understand then that when number seven white key is down, the face is fully attractive, just the same as it is with *all* the keys on that bank *up*. Do you follow me?"

"Absolutely," nodded Tubby. "I doped that out long ago."

"Well," said Sir Isaac, "with these ninety keys, working singly or together, a very great number of combinations can be obtained. We can go in any direction we choose, and at almost any velocity—at least I have never been able to calculate any limit to the velocity if sufficient time for acceleration is allowed."

"Right," agreed Tubby. "You mean we don't get up speed all at once—we keep goin' faster. That's good. . . . Show us what's doin' now."

"Our present course is very simple," continued Sir Isaac. "You observe five of the red keys are down—the top and all four sides of the vehicle are neutral to gravity. On the bank governing our base the *first* white key is down. We are being drawn toward the sun, pulled by one-seventh of the sun's attraction. If we wanted to go faster we could use more of the sun's attraction, or some of the repulsion of Venus. If we wanted to go slower, we could combine some of the *attraction* of Venus, which would act as a drag. By balancing the attraction of Venus

and that of the sun we could stop entirely. . . . I think I shall use another seventh of the sun's attraction. Watch carefully."

Sir Isaac suited the action to the word, pressing down the second white key of that bank, and then releasing the other.

Tubby watched closely. "That's easy. What else?"

For half an hour more Sir Isaac explained the navigation of space—with practical demonstrations, during which he made the heavens swing over at will in most dizzying fashion as he altered the vehicle's course. Finally Tubby announced himself satisfied, and competent to assume charge for a few hours at least.

"You go lie down," he said. "We'll get you up when Ameena has lunch ready."

Still Sir Isaac hesitated. "In half an hour," he explained, "I would, I think, increase our speed by using about three-sevenths the repellent power of Venus."

He indicated the changes. "Our velocity is steadily increasing as we approach the sun—but we must go still faster. We *are* in a hurry."

As he turned to leave the room, his face clouded with sudden anxiety.

"We shall shortly attain a velocity of nearly seven million miles an hour," he said soberly. "I—I hope I'm not taking too great chances. It's so crowded in here with meteorites. We've been marvelously lucky so far."

"Go on to bed," commanded Tubby. "I ain't goin' to let us hit nothin'. I'll watch. If I see anything comin' I'll thump them keys, or yell for you."

Most reluctantly, Sir Isaac gave up command; and, with Ameena's gracious permission, he retired to one of the upper bedrooms.

### Trouble!

**I**T really was Ameena's fault, though Tubby was too much a gentleman ever to say so—for if Ameena had not called him into the kitchen it could never have happened. She had gone to prepare the noonday meal, and Tubby reluctantly had parted with her and maintained his post at the lower window of the instrument room. The sun shone up at him intolerably bright.

Nothing showed in the sky below, except that huge, flaming red ball slowly but steadily increasing in size—the sun as it appeared through the smoked glass—and those glorious constellations of stars hanging immovable in the black firmament. In thirty minutes exactly, by the instrument room's chronometer—Tubby had added to their velocity three-sevenths the repellent power of Venus. This world they were so rapidly leaving hung directly overhead—an enormous silver-blue sphere now completely illuminated by the sun, but visible only from the upper windows of the vehicle.

It was just after he had put on the additional speed that Ameena had called Tubby into the kitchen to ask him how to open a can of tomatoes for canned goods were unknown on Venus. Tubby, once in the kitchen, had forgotten to return to his post. He was sitting in the doorway of the adjoining store-room, chatting vivaciously with Ameena, when suddenly he became aware of an unusual light coming diagonally in through the side window.

Leaping up, he saw in the black, starry void a

huge silver disc—a thousand moons in size! It was below them, off to one side. It was so close he could see barren, rocky mountains on it; and it was turning over like a ball thrown into the air. Even while he gazed, with his heart in his throat, it doubled in size, so stupendously fast was it approaching—and already exerting its attractive power upon the base of the vehicle, it was altering the vehicle's course so that the heavens began shifting sidewise.

With a startled cry, Tubby dashed into the instrument room, Ameena following him with the can of tomatoes still in her hand. Through the instrument room floor window the heavenly derelict, again doubled in size, shone directly beneath them. They were rushing into it, drawn irresistibly by its attraction!

Tubby took one horrified glance, and then, jumping to the keyboard, he depressed half a dozen of the keys indiscriminately. There was no answering vibration perceptible within the vehicle; but outside its windows the heavens were whirling! The sun, Venus, the threatening derelict globe, a myriad of stars—all flashed past the windows so rapidly they were distorted into mere blurs of light. The vehicle, beyond control, was spinning on its axis and falling abandoned in space!

Tubby and Ameena, standing stock-still on that solid, apparently motionless floor, were giddy at the sight.

"Oh-h, perfessor!" Tubby bellowed. "Help, perfessor! Come here quick! We're all fallin' to pieces!"

Sir Isaac came clattering downstairs, his apparel awry, his face still dazed by sleep. With one quick glance at the windows he hastened to the keyboard. Tubby and the girl stood anxiously beside him.

"Somethin' w-went wrong," Tubby chattered. "There's a b-big world right outside. We war r-runnin' into it."

The vehicle, spinning like a top, gave Sir Isaac no opportunity of locating the correct keys to depress. He first threw them all into neutral; then tried, tentatively, throwing the attraction into the base of the vehicle for that instant when it was facing Venus, and releasing it an instant later.

For five minutes he worked, his face pale with anxiety. "Am I stopping our rotation?" he asked. "Are we slowing down?"

Tubby forced his gaze to the window and saw that the heavens were spinning with a little less rapidity.

"Go on," he encouraged. "You're doing' fine."

"I don't dare leave everything in neutral," Sir Isaac muttered to himself. His gaze was glued to the floor window; the perspiration was rolling down his face. "Inertia would carry us forward on our former course without any force of attraction. We could not avoid collision. Perhaps we cannot anyway."

"Don't say that," pleaded Tubby. "Go on. You're doin' fine."

Ameena now crouched on the floor, gripping a chair leg to steady herself; and peered intently downward through the window. At each instant when Venus came into view she called to Sir Isaac, and he promptly depressed the necessary key, releasing it once the planet had swung past. With Ameena's help he did this more accurately than before, and gradually the vehicle's axial rotation was decreased.

Finally they caught Venus and held it directly beneath them.

Sir Isaac stood up, trembling. "Thank God!" he exclaimed. "We are headed the other way. The danger is past."

Now that the excitement was over, Tubby felt extraordinarily weak in the knees. He sat down in a chair, panting.

"What was it, professor? What happened?"

"An asteroid," Sir Isaac answered, smiling weakly. "A minor planet, unknown to astronomers. I knew its orbit lay in here, but I had calculated the asteroid itself to be on the other side the sun this month—fool that I was!"

A moment later, carefully, Sir Isaac resumed their former course. The asteroid had disappeared; the sun now shone up from beneath them as before.

"How close did we come to it?" Tubby asked, when they had all three recovered calmness. "I guess we didn't miss it by more'n a mile."

"We passed it about 4,000 miles away!" Sir Isaac answered.

Tubby was amazed. "Four thousan' miles! An' I thought we nearly hit it!"

Sir Isaac smiled. "I should not care to come any closer. Our velocity at that moment was 7,200,000 miles an hour. That is exactly 2,000 miles per second. In just two seconds more we would have collided with that asteroid and been annihilated! That's why I said we were crowded in here. It is very dangerous to approach within a million miles of anything."

They had lunch shortly after that, Sir Isaac insisting on having his served on the store-room floor so that he might keep close watch through the lower window there, for comets, and even infinitesimal meteorites, as well as asteroids, were to be avoided. As Sir Isaac pointed out, to collide with even a hundred ton meteorite at a velocity of 2,000 miles a second would be a fatal catastrophe!

After lunch, over their cigars, while Ameena straightened the kitchen, Sir Isaac told Tubby about Mercury, which he had hoped they would reach about five o'clock that afternoon, but which now they might not arrive at before six or seven o'clock.

"Mercury," Sir Isaac explained in his slightly pedantic way, "is the smallest of the major planets, and the closest to the sun. Its orbit lies at a mean distance of 36,000,000 miles."

"An' how far did you say Venus was from the sun?" Tubby asked. He was becoming avid for astronomical mathematics.

"Sixty-seven million," answered Sir Isaac.

"An' the earth is 93,000,000. An' the moon a quarter of a million from the earth." Tubby was memorizing the figures. "All right. Go on."

"Mercury makes one revolution around the sun every eighty-eight days. That is the length of its year. It is so close to the sun that the enormous solar attraction holds one side of it always facing that way. Hence its axial rotation is also once in eighty-eight days, and it has no day or night—always daylight, twilight or darkness according to what portion of its surface you are on."

"What part are we goin' to?" Tubby demanded.

"To the Light Country, where there is daylight—

but it is not too intense. Heavy clouds and a dense atmosphere make life possible on Mercury, even though it is so near the sun. In the Fire Country, which directly faces the sun, the planet is practically uninhabited. We will land at the Great City—the largest center of population on the planet. It is the Light Country people we want to enlist as allies, against their outlaw neighbors, the Twilight people and those horrible Martians."

This brought them again into a discussion of the Martian plot which they were determined at all hazards to frustrate. Ameena joined them shortly after that, and for hours they argued, without however, reaching any new conclusions.

Sir Isaac was momentarily growing more sleepy; and finally, when Tubby had solemnly promised that for two hours he would not leave the window under any circumstances and would call out at once if anything unusual came into sight, Sir Isaac again retired. They were then about 18,000,000 miles from Mercury, which shone as the brightest star in the lower hemisphere of the firmament, visually quite near the sun's outer limb. And so great was their haste that again Sir Isaac had resumed almost their former speed.

During these two hours, Tubby and Ameena sat on the floor by the window, exchanging accounts of their respective worlds.

"I'm strong for Venus," Tubby declared once. "When we get these Martians put in their place, an' get our moon back, I believe I'll come to Venus to live."

The girl agreed that would be very nice indeed; and Tubby, intoxicated by her beauty and the fragrance of her person, suddenly laid his hand over hers.

"Ain't this romantic though—shootin' around the sky like this? Sing somethin', Ameena. Where's that harp you had?"

Ameena played on her lyre, and sang; Tubby listened, and complimented her, and urged her constantly for more. Thus absorbed in their youth, the two sat oblivious to the vehicle's course, while the sun blazed larger and hotter, and Mercury grew from a gleaming star to a silver crescent—larger and larger until, like Venus of the morning, it stretched an enormous arch in the blackness, with the sun to one side behind it.

Fortunately for the safety of these bold voyagers (and indeed for the future existence of earth itself, which depended upon the success of their mission), no other uncharted wanderers of space chanced to be in the vehicle's path during those two hours.

It was nearly half-past four when Tubby came to himself. A glance through the window reassured him that all was well, and, reluctantly tearing himself from Ameena's presence, he went upstairs to awaken Sir Isaac.

They entered the atmosphere of Mercury at 6:57 P. M., shortly after a hurried supper. Falling diagonally over the Dark Country, they came into the Twilight Zone. A few moments later the Narrow Sea lay beneath them, and at last they sighted the Great City at the edge of the Light Country.

It was 7:29 P. M. exactly when, with only a slight jar, they landed upon the surface of Mercury.



## CHAPTER V

**In Which the Mercurians Prove Themselves Utterly Selfish, and the Disappointed Voyagers, Pursued by the Enemy, Hasten to Jupiter**

**H**OW selfish is human nature the Universe over! After a voyage of some thirty million miles, the travelers might quite as well have remained on Venus! The Mercurians of the Light Country were sorry—indeed, they greatly deplored the action of their neighbors of the Twilight Country in joining with the war lords of Mars against the unoffending Earth—but they would do nothing about it! How simple all human problems become, when viewed in that detached spirit! How human nature does repeat itself, wherever in the Universe it may be found!

The audience with the ruler of the Light Country took place at 9:40 p. m., Earth's Eastern Time—shortly after the First Meal, as time chanced to be on Mercury.

Tubby, Sir Isaac and Ameena gravely faced the white-haired King and his aged dignitaries who were seated around a huge table in the Audience Room. The place was crowded; its gallery above, open to

the public, was thronged with those curious to see these strange visitors from another world.

Sir Isaac, who, fortunately, was fairly fluent in the Mercurian tongue, explained their mission. He was earnest and eloquent. And when he had finished having done his very best, the King, after a whispered conference with his councillors, made his speech of condolence!

Sir Isaac was aghast. He translated the King's words briefly to Tubby and Ameena.

"How dare they?" the girl cried. "It is inhuman. Tell him *I* say——"

Sir Isaac interrupted her, in a whisper, for the Audience Room was intensely quiet.

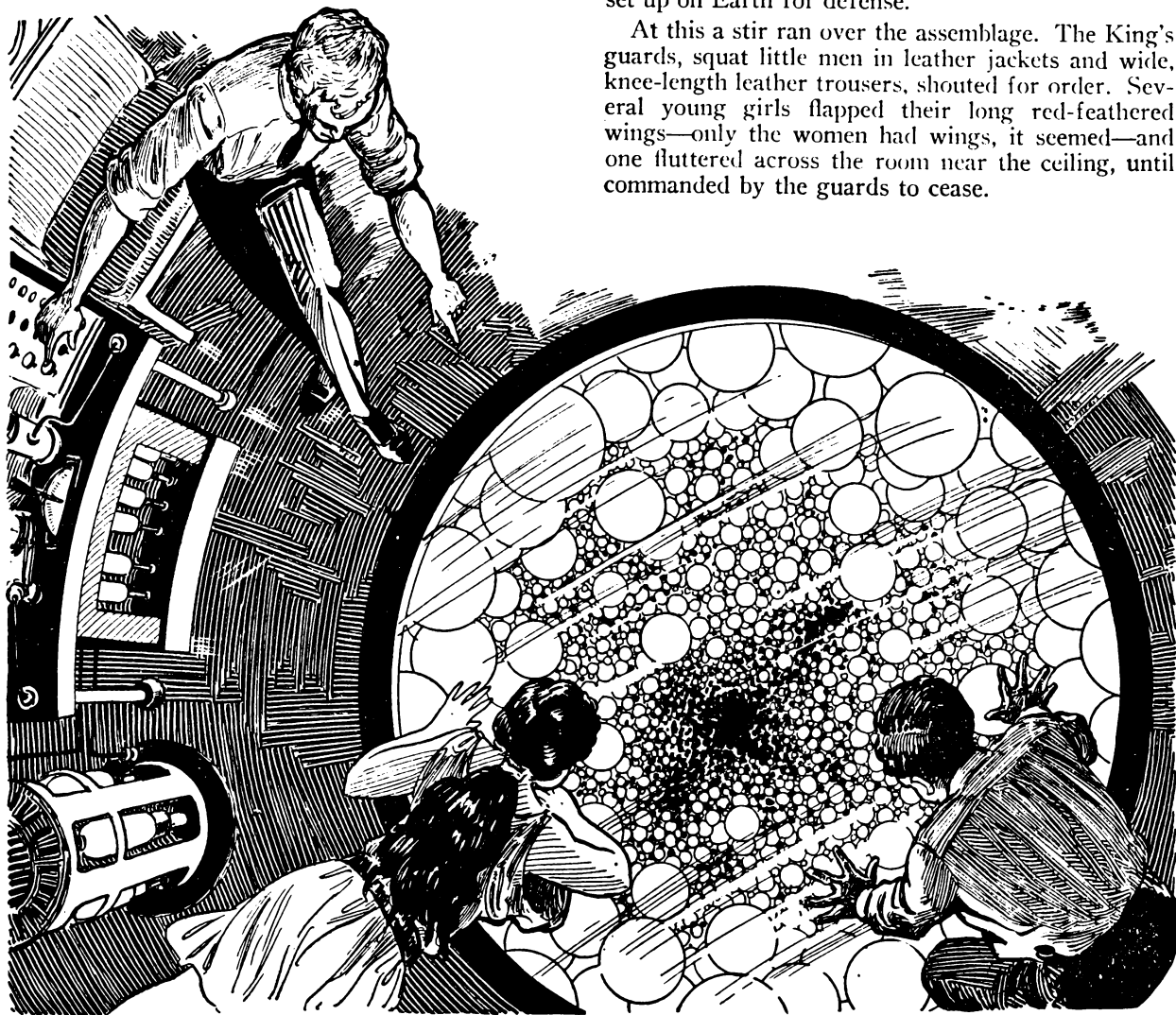
"*Your* position is not so impregnable, Ameena. Your own people refused to mix up in this interplanetary war. How can you expect——"

"My people have no weapons of war," she defended passionately. They know nothing of fighting. Never has a voice been raised in anger in my world! What could they do to help, if they would?"

"You let her alone," Tubby whispered vehemently to Sir Isaac. "She's got the right idea. You tell this King *he* can help. Ain't he got that Light-ray? Make him lend it to us."

Sir Isaac then requested the use of the Light-ray—a sufficient amount of its apparatus which they could set up on Earth for defense.

At this a stir ran over the assemblage. The King's guards, squat little men in leather jackets and wide, knee-length leather trousers, shouted for order. Several young girls flapped their long red-feathered wings—only the women had wings, it seemed—and one fluttered across the room near the ceiling, until commanded by the guards to cease.



They entered the Milky Way on the seventh day after passing Alpha Centauri. Though their actual entrance into the Galactic Plane was unmarked, the firmament simply blazed with bright stars.

The King looked exceedingly grave at Sir Isaac's request; his whispered conference with his advisors lasted several minutes. At last he shook his head.

Sir Isaac translated his answer. "He says he is sorry. They could not trust their Light-ray to another world. He claims the Earthmen would then learn its secret and some day might use it against Mercury."

"He's a fool!" shouted Tubby angrily. "Ain't they got it on Mars already? An' maybe on Jupiter?"

### Tubby Sassess the Mercurian King

HE turned toward the King. "Say listen here you——"

Thirty feet separated Tubby from the King at that moment, but he encompassed it in one bound, for on so small a planet as Mercury even Tubby weighed hardly sixty pounds! He landed beside the King's chair.

"Say, listen here you——"

As Tubby's fat little body went hurling through the air pandemonium broke out in the room. Girls were fluttering about; the guards were pushing and showing the crowd. One or two of the older women fainted. A little boy broke into terrified screaming.

The King, finding he was not hurt, ignored Tubby's fist in his face, and with rare presence of mind rose to his feet, shouting reassuringly to the assemblage. Three of the nearest guards, their faces dark with anger, were making for Tubby belligerently; one of the aged counsellors put a restraining hand on his shoulder, but he shook it off.

Sir Isaac bawled:

"Come back here, you fool! They'll kill us all!"

It was Ameena's pleading voice, rising above the tumult, that brought Tubby to his senses. He stopped abruptly his abuse of the King, and with another prodigious bound leaped over the heads of the intervening people, and landed back beside his friends.

"Come on, let's get out of here," he gasped. "This here Mercury ain't goin' to get us nothin'."

Sir Isaac, with true diplomatic suavety, waited until order was restored. He then paid his respects to the King, apologizing for Tubby's conduct, and stating with curt dignity that the Earth would solve its own problems and look after its own safety in its own way. After which, escorted by the King's guards to protect them from the incensed populace, the three visitors coldly departed.

As they left the room, a young girl—with huge wings and a sneering, unpleasant face, so different from the beauty of the other girls in the room as to mark her of another nation—climbed from the balcony into one of its outer windows. Poised there a moment, she launched herself into the air, spread her wings and flew away.

Sir Isaac, Tubby and Ameena were on the palace steps when this girl flew past, just over their heads. She shouted something venomously at Sir Isaac, and rising higher, flew rapidly toward the Narrow Sea and the Twilight Country.

Sir Isaac did not mention this incident then to Tubby or Ameena, who had not noticed the girl. Indeed, he forgot it in a moment, though afterward it was brought most vividly and unpleasantly to his memory.

### Flying Through Space Once More

IT was 11:45 p. m., Earth time, when the vehicle was again launched into space. When they had passed over the Dark Country and had left the atmosphere of Mercury—headed this time away from the Sun, back toward Venus and the Earth—the three inter-planetary adventurers sat down quietly in the instrument room to determine what should now be done, in the face of this unexpected disappointment.

"An' here we went an' wasted all day," Tubby moaned. "We could have been almost anywhere while we was foolin' around here with them selfish, pin-headed——" He trailed off into abuse of the Mercurians.

Sir Isaac, more practical, summed up the situation as it now stood.

"We have, of course, no means of knowing whether the inhabitants of Jupiter are against us or not," he said. "But at all events, at the next opposition of Mars with the Earth we may expect their attack."

"Less'n two months from now," Tubby put in gloomily.

"In fifty-six days and eighteen hours," Sir Isaac corrected. "I assume their method will be to mass their army first upon the Moon. From that point of vantage, always close to the Earth, they can launch their successive attacks at will."

"That is what they will do," Ameena cried. "From the Moon, of course."

Tubby frowned. "What will they do to the Earth? You say they're goin' to kill us, but you ain't never said how."

Then Sir Isaac, his voice trembling in spite of himself, explained the horribly destructive power of the Mercurian Light-ray—that beam of red-green light-fire, which from giant projectors ignited everything within its path over a distance of fifteen miles! And the tremendous war-machines of the Martians—giant mechanical bodies housing the Martian directing brain in their tops—mechanisms with metal legs like steel girders fifty feet long running rampant over the Earth!

"That's enough!" interposed Tubby hastily, mopping his face. "Don't tell us nothin' more like that. My idea is, we better not let 'em land on the Earth."

"Quite right," agreed Sir Isaac. "But how to prevent them? That's just the question."

It was the question indeed, and for another hour they wrestled with it.

"Let's eat," Tubby suddenly announced. "We can do that if we can't do nothin' else."

Tubby now found himself, after this episode on Mercury, somewhat more in the nature of leader of their enterprise than he had been before.

"We're done with Mercury," he said, when over the midnight supper the argument was resumed.

Sir Isaac nodded. "We are, most certainly."

"An' Venus ain't no use to us."

"No," Ameena put in. "My world is powerless."

Tubby went on with merciless logic:

"If we go home an' wait, we're licked sure."

"Yes," agreed Sir Isaac, "that will mean absolute annihilation, even though the world's armies and navies were massed to our defense."

"An' we *can't* land on the Moon," Tubby persisted. "They'd murder us in thirty seconds—on our own Moon too." The pathos of this struck Tubby with

sudden force. "Ain't that actually criminal? Can't land on our own Moon!"

"What *are* we going to do?" Ameena asked hopelessly. "Oh, dear, we cannot seem to land anywhere."

"How about Jupiter?" Tubby demanded. "That's a big place, ain't it?"

"The largest planet of the solar system," said Sir Isaac. "But whether they are friends or enemies—"

"Well let's go see an' find out!"

The logic as well as the daring of this simple suggestion was immediately apparent.

"If them Jupiter people ain't enemies they can help us easy." Tubby added. "Let's take a chance anyway."

There seemed nothing else to do. The Earth was powerless to defend herself. Help must be obtained—from whatever source—at all costs.

And so it was decided.

### The Course Set for Jupiter

**B**ACK in the instrument room Sir Isaac computed their course to Jupiter. A little later, for it was then nearly three o'clock in the morning, Ameena retired to the upper floor.

The vehicle had now reached a point in space almost midway between Mercury and Venus. Tubby suddenly remembering the asteroid with which they had so nearly collided that afternoon, peered anxiously down through the lower window, to the tiny blue-white disc among the stars that was Venus.

Sir Isaac, hearing Tubby's muttered exclamation concerning the asteroid, laughed reassuringly.

"It has passed on in its orbit," he said. "Rushing around the Sun in a most eccentric ellipse, it is now many million miles from here."

Having been the one to suggest their future course of action, Tubby was feeling his growing responsibility. He felt simultaneously his need for more specific astronomical information than he now possessed.

### Tubby Learns More About Stars and Orbits

**"I**F I'm goin' to boss this expedition," he announced, "I got to have all the dope in my head."

Sir Isaac had frequently been tracing their flight upon a celestial map of his own making, and Tubby now demanded to see it. Sir Isaac produced it readily, from the table drawer, and clearing a space on the table, unrolled it before them. By the light of an electric bulb—for the side and floor windows admitted nothing but starlight—Tubby examined it.

"This is merely a rough drawing I made myself," Sir Isaac explained apologetically. "It shows the solar system—though not at all to scale—and gives a rough idea of the present positions of the planets, and our course up to date."

This is what Tubby saw:

"You notice," said Sir Isaac, indicating with his pencil point, "that the Sun occupies the center of the solar system, and the planets revolve around it in concentric rings which are called orbits. These are not circles, but are ellipses—so that the Sun is not exactly in the center, but a little off to one side—in one of the foci of the ellipse, to be technical. Thus the orbit is somewhat nearer the Sun in one portion and further away in another. The amount of this

difference is called the eccentricity of the orbit."

Tubby nodded his comprehension; Sir Isaac went on:

"Fortunately, as you observe, all the planets chance to be on this side the Sun just now. . . . I must alter our course toward Jupiter. We are now headed for Venus, but Jupiter, you see, is considerably further along in his orbit."

Sir Isaac went to the keyboard, and a moment later Venus, as seen through the lower windows, swung sidewise out of sight. A new region of gleaming stars—none of unusual brightness—came into view.

"I am heading well past Jupiter," said Sir Isaac. "We are falling diagonally sidewise now, *forward* by the combined attraction of all those stars, and *sidewise* by the repulsion of Venus and the Earth and all the stars behind them. This will bring us into a direct line drawn from the Sun to Jupiter—and then I can make better speed by using the Sun's repulsion and Jupiter's attraction combined, which I cannot do now."

By careful consultation of the chart, Tubby finally got this clear.

"It's a longer route," Sir Isaac added. "But I think it will prove quicker. . . . You'd better lie down, Tubby—you're tired out."

Tubby was indeed terribly sleepy—but, unselfishly he realized that Sir Isaac must be also.

"I'll watch," he said. "You take a nap."

But Sir Isaac wished to get the vehicle upon its direct course first.

"We'll be in line with the Sun and Jupiter in about two hours," he explained. "I'll call you then. From then on we will hold the same course all the way."

Tubby yielded, and started upstairs. Then, remembering Ameena, he went into the store-room instead, and with the cushions from one of the chairs of the instrument room for pillows, stretched out on the floor and went to sleep promptly.

\* \* \*

"Wake up," said Sir Isaac, shaking him. "It's seven forty—you've been asleep nearly four hours."

Tubby rubbed his eyes, and clambered to his feet.

"What's doin'? Anything new? Where are we?"

"We're on our direct course to Jupiter," Sir Isaac answered. He had shaved and washed. His hair was slicked back and he was smoking a cigar; but his face was haggard and he looked tired out.

"You can take charge now," he added. "I must get some sleep, if only for a few hours."

Tubby sat alone on a cushion at the floor window of the instrument room. The Sun, from which they were now receding, as Sir Isaac had told him, at a velocity of 15½ million miles an hour, was blazing high over the roof of the vehicle, and thus was invisible from the starlit room downstairs. Through the floor window Tubby could see nothing but gleaming silver stars. One of them, he could not distinguish which, was Jupiter.

Tubby whistled to keep himself awake. After an interval he looked at the chronometer. It was 8.20 A. M. Why didn't Ameena wake up? Tubby was lonesome and depressed. A little later he went into the kitchen and made himself a cup of coffee. Again he wished fervently Ameena would come down and join him. Should he wake her up? Wasn't it time for breakfast? Wouldn't she even come down?

For another hour he wandered disconsolately about the lower rooms, glancing at intervals through the floor windows to make sure no derelicts were in

sight. Remembering Sir Isaac's jaunty appearance, he shaved and washed—fortunately having had the forethought, the night before, to rescue his razor from the bedroom upstairs.

He had about decided in desperation to awaken the girl, when, on an impulse he climbed into the little dome on the roof where Sir Isaac had mounted a small telescope. A moment later he was clattering down through the vehicle, bellowing loudly for Sir Isaac and Ameena.

### The Sky Travelers Are Followed

"HEY, perffessor! Ameena! Oh, Ameena! Get up, quick! There's somethin' follerin' us!"

Sir Isaac came bounding upstairs from the store room, meeting Tubby in the upper hallway. From one of the bedrooms came Ameena's sleepy voice:

"What is it? *Must* I get up?"

Together the two men rushed up into the little observatory. Another vehicle, twice as large as their own and somewhat different in shape, hovered almost directly above them, showing as a dark spot in the firmament and edged with silver from the Sun's rays behind it.

"That Mercurian girl!" Sir Isaac gasped, with sudden memory. "She flew to the Twilight Country! She said she was going to have revenge!"

They were indeed being followed! This pursuing enemy was at that moment hardly more than five miles away, and was overtaking them rapidly!

## CHAPTER VI

### In Which the Voyagers Pass Mars, Dodge the Minor Planets and Interview His Supreme Highness the Great Mogul of Jupiter

SIR Isaac dashed back to the instrument room three steps at a time, with Tubby at his heels. Ameena came from her room and followed them.

"What is it?" the girl demanded. "Is something wrong?"

Tubby called back over his shoulder:

"Them Mercurians is after us. Right overhead—comin' fast. Come on down—we got to do somethin'."

Sir Isaac rushed to the keyboard.

"Switch our course," Tubby suggested. "Let's see if they can turn when we do. . . . Or how about goin' faster? Can we go faster?"

"Wait," commanded Sir Isaac. He depressed two keys—a black one on one bank and a white one on another—and raised the ones which had been down. Then he dashed away upstairs again.

Tubby had no more than time to compliment Ameena on her appearance—she was dressed quite as on the day before, but he face was flushed with excitement and her eyes sparkled, so that she was more beautiful than ever—when Sir Isaac was back. He sank into a chair and smiled at them weakly.

"That danger's past, for the moment. We have left them out of sight behind us."

"So quick?" exclaimed Tubby. "Out of sight already? We must be goin' some."

Ameena looked her relief. Sir Isaac made some further adjustments of the keys.

"I've just slowed us up again," he said. "I would not dare go as fast as we would very soon have been going."

"Well, how fast are we goin' the way you got it now?" Tubby persisted.

### 28 Million Miles Per Hour

"ABOUT 28 million miles an hour," stated Sir Isaac. "Of course I haven't computed it yet—but I judge we shall shortly attain that velocity. I am now using six-sevenths of the Sun's repulsion with everything else in neutral. Our rate of speed depends very largely on the length of time allowed for acceleration, you understand."

He gazed down through the lower window anxiously, and muttered:

"Heavens, I do hope nothing gets in our way!"

"Maybe we better slow up," Tubby suggested. It did seem a trifle fast to be going, when he came to think of it. On the other hand such a speed was not in the least beyond his understanding now. Sir Isaac had already explained something of the laws governing freely falling bodies; and Tubby had recalled that old stunt of dropping a baseball from the top of the Washington Monument, which fell so fast even in that little distance that the professional catchers could hardly catch it. The vehicle was more than a freely falling body—it was being *pushed* downward.

Sir Isaac shook his head at Tubby's suggestion that they slow up a bit.

"We must chance the danger," he said, though not without considerable perturbation. "That Mercurian vehicle may be able to attain this speed also—or even a greater one. We cannot tell."

"Suppose they *should* overtake us," Ameena speculated. "They could not board us—or collide with us without death to themselves?"

"They might have some means of destroying us—I do not know," Sir Isaac replied. "Though possibly the Light-ray is useless in Space." His voice became meditative. "Curious I never thought of *that* before. I suppose it *would* be inoperative."

"I think," said Ameena, "that they are merely trying to reach Jupiter before us. Perhaps they want to warn the Jovians against us. To persuade them not to—"

"Meaning—?" Sir Isaac interrupted eagerly. The poor man's mind was working so constantly that he seemed grateful to anyone who would do his thinking for him.

Ameena finished:

"Meaning that I think it shows that on Jupiter the rulers are at least neutral."

"Sure," exclaimed Tubby. "You're some clever girl, Ameena. If them Jovians was our enemies, these Mercurian guys wouldn't bother chasin' us there. They'd know we'd get walloped anyhow. You got the right idea, kid." He gazed admiringly at Ameena, and the Venus-girl blushed charmingly.

This conclusion, thus happily arrived at, cheered the three adventurers immeasurably. They now felt tolerably certain of at least a square deal on Jupiter—if only they could arrive there ahead of the enemy.

"Well, that bein' settled," declared Tubby, rising. "Let's eat."

On this flight outward from the Sun they had crossed the orbit of Venus about 6.30 A. M., while Tubby and Ameena were asleep—though this course to Jupiter took them many million miles ahead of Venus' position in her orbit. This Tubby and Ameena readily understood by another glance at Sir

Isaac's drawing, which they consulted soon after breakfast.

About 8.15 A. M., while Tubby had been on watch alone, they had crossed the orbit of the Earth—though nearly twice as far then from the Earth as they had been from Venus.

"Mars revolves around the Sun at a mean distance of 141,701,000 miles," said Sir Isaac, some little time after breakfast. "We should have intersected his orbit about 10.40 A. M.—that was when we were closest to him."

"An' you didn't tell us!" cried Tubby reprovingly. "I want to get a look at that—that murderin' villain."

It was then about ten minutes of eleven. Mars, to which they had passed comparatively close, still showed as a half-lighted, circular, reddish disc. Its tracings of fine intersecting lines—the "canals"—were quite distinguishable.

Even at the enormous velocity the vehicle had now attained, all the heavenly bodies hung apparently motionless in the firmament—except Mars, which because of its nearness, seemed slowly moving upwards as the vehicle dropped past it.

Tubby, standing at the side window, shook his fist at the disturber of the peace of the Solar System.

"We'll fix you yet—you——"

Ameena laughingly pulled him away.

"Is Mars as large as my Venus?" she asked Sir Isaac. "Or your Earth?"

"The diameter of Mars is 4,316 miles," said Sir Isaac. "The Earth is 7,917 and Venus 7,629."

"Only a little guy!" Tubby was contemptuous. "That's the way with them little fellers—Mercury too—always lookin' for a scrap."

Sir Isaac went on:

"Mars revolves around the Sun once in a little less than 687 days. That is the length of his year. His orbital speed is 15 miles per second. He is ahead of the Earth now in his orbit, but the Earth travels forward at the rate of 18½ miles per second. Thus you see, the Earth is overhauling Mars—and when they are both in line with the Sun, that will be opposition. That's their closest point to each other until the Earth comes around again—and that's when the Martians will attack."

Sir Isaac, because of one threatened catastrophe or another, had had so far very little sleep since leaving the Earth two days before. About half past eleven that morning Tubby and Ameena sent him to bed again.

"Don't let me sleep more than two hours at the most," he said anxiously. "There are thousands of Minor Planets in here between Mars and Jupiter."

"Shucks," disclaimed Tubby. "That don't make no difference. Ain't I on guard?"

It was a magnificent chance for sarcasm, but the sterling character of Sir Isaac forbade such weakness. All he said was:

"Our velocity of 28,000,000 miles an hour would be sufficient to carry us from Earth to Venus, or from Venus to Mercury in a little over sixty minutes! I don't want you to forget how fast we are falling now."

With which admonition he retired.

It was a long, tiresome, comparatively uneventful day—at least it would have been, if Tubby had not had Ameena's companionship. She sang to him again; and with his somewhat raucous tenor voice they contrived "Inter-planetary duets" as Sir Isaac jocularly called them. When they had tired of music

they climbed into the dome to make sure their pursuers had not again come into sight. The overhead sky, out of which they were falling, showed nothing unusual. Mars—well above them now—had dwindled to a small, reddish star; the Earth, Venus and Mercury were indistinguishable among the mass of other glittering worlds.

"Look at the Sun," said Tubby. He pulled Ameena toward him. He had indeed, progressed to where his arm was almost constantly about her, which, since youth and love are the same the Universe over, Ameena accepted as quite reasonable and natural.

"Ain't the Sun gettin' little?" Tubby added.

The orb of day had dwindled to half its apparent size as viewed from Earth. The vehicle too, was growing hourly colder. Ameena shivered a little.

"Come on down," said Tubby solicitously. "We'll have to get the perfessor to heat the place up more—an' get you dressed warmer." His appreciative glance swept Ameena's dainty figure. "I'll see what I can dig you up—right after lunch. Come on down where it's warmer—let's play cards."

Explaining to the girl the intricacies of the fifty-two different cards of the deck took nearly another hour, after which Tubby's stomach peremptorily informed him that it was time for lunch. He swept up the cards, and with sudden thought gazed anxiously down through the lower window to see if they were about to collide with anything. Jupiter had grown to a marvellously brilliant star; beyond that, everything was as before.

"You go fix up somethin' to eat," he said to the girl. "I'll call the perfessor—he's asleep long enough anyway."

Sir Isaac came down shortly, dressed in a warm-looking tweed suit with golf trousers. Glancing at the chronometer, he immediately plunged into an intricate mathematical calculation.

"Our velocity since 9.30 this morning has averaged just 28,502,122 miles an hour," he announced a little later. "My guess was right."

"Good," said Tubby. "Come on into the dinin' room. Lunch is ready."

After lunch Tubby himself dressed more warmly—in a Norfolk jacket golf suit and heavy grey flannel shirt, an outfit that was extremely becoming. He then sent Ameena upstairs, magnanimously offering her anything and everything in the way of apparel she could find. She returned a few moments later, and stood shyly awaiting his approval. She had dooned a heavy pair of golf stockings and rubber-soled shoes which miraculously were almost small enough for her. And over her knee-length white dress, she was wearing a natty-looking man's overcoat which almost swept the ground. Her hair was now piled on her head, with a huge, red-silk handkerchief bound around it.

Even Sir Isaac glanced up from his figures long enough to admire her appearance. She looked indeed, like a radiantly beautiful little Earth-girl, on her way to the beach for a swim.

"Fine," declared Tubby. "Keep that coat buttoned up an' you'll be nice an' warm."

They were now—it was about 2.30 P. M.—more than half-way in distance from Mercury to Jupiter, Sir Isaac announced.

"Tell us somethin' about Jupiter," said Ameena, sitting down beside Tubby and giving him her little hand to hold. "You said it was a very big Planet."

"It's mean diameter is 87,380 miles," Sir Isaac answered. "Its volume is 1390 times greater than the Earth!"

"Some big Planet," Tubby commented.

Sir Isaac added:

"And it makes one revolution around the Sun in 4332.5 days. Thus its year is equal to 11 years, 314.9 days on Earth."

"My goodness," said Tubby.

"But Jupiter's *day* is only about 9 hours and 56 seconds long. That is because it rotates on its axis so very swiftly."

Tubby interjected.

"This here Jupiter's a *re-mark-able* Planet, ain't it?"

"Go on," said Ameena. "Tell us more."

Sir Isaac seemed embarrassed. "Well to tell you the truth," he said hesitantly, "I don't really know very much about Jupiter. You see I've never really had occasion, up to now, to—"

"Right," interrupted Tubby. He had no wish to be hard on his friend, especially before a girl. "What's the difference? We'll soon be there an' see it for ourselves. . . . When *do* we land, perffessor?"

Sir Isaac looked worried again.

"At our present velocity I calculate we should enter the Jovian atmosphere about 10.15 P. M. to-night, but—"

"Very good, *in-deed*, perffessor."

"But I dare not maintain this velocity," Sir Isaac finished.

"Why not? Ain't we in a hurry?"

"We *are* in a hurry certainly," Sir Isaac conceded. "But, as you know, the more haste the less speed sometimes. We are now in the region of Minor Planets. More than eight hundred of these little worlds have been discovered and listed, even by those inefficient astronomers of Earth. I have never given the subject much attention—except in the case of 'Hector Servadac'—and in *that* story—"

"*We* ain't seen no Minor Planets yet," Tubby hastily interrupted.

Sir Isaac drew him and the girl to the side window.

"There are a dozen or so," he said simply.

Tubby made them out after a moment—very tiny half-moons gleaming among the stars. They were apparently moving upward as the vehicle fell past them, while all the stars appeared quite motionless.

"Some of these little worlds are only from a few hundred thousand to a million miles away from us," Sir Isaac added. "We could reach them with this velocity in a minute or two! They're all around us now—so you can understand what chances we're taking."

Tubby understood indeed; and when, a little later, he saw through the lower window a gleaming disc come into sight, grow to the size of the Moon, and sweep past them to one side and out of sight above them—all in the space of a minute—he was glad enough to have Sir Isaac reduce his speed. It gave the pursuing Mercurian vehicle a better chance to overtake them, of course, but even that was the lesser of the two dangers.

The evening was a long one. Tubby and Sir Isaac played cards after dinner, with Ameena an interested spectator. They discussed their Mercurian pursuers a little—the other vehicle had not again appeared. Ameena retired about ten o'clock and Sir

Isaac, shortly afterward, lay down at Tubby's feet on the floor of the instrument room.

Tubby faithfully kept watch until two in the morning. Jupiter was now considerably larger than the Moon appears from Earth—a silver disc with broad dark bands on it, and a huge red spot, like a dull red lantern gleaming from its lower hemisphere. The red spot winked and went out shortly after Tubby discovered it.

When Sir Isaac woke up, of his own accord, Tubby, too tired to ask any questions, fell asleep on the floor, wrapped up in a blanket from the vacant bed upstairs. He dreamed he was a railroad train and that Jupiter was flagging him with a red lantern. He wanted to stop, but couldn't. There was a terrible collision. . . .

Tubby opened his eyes to find Sir Isaac shaking him violently.

"All right," he protested, sitting up dizzily. "Lemme alone. What time is it? Ain't we there yet? Where's Ameena? "What's that red light comin' from?"

### The Travelers Approach Jupiter

IT was just six o'clock. A lurid red glare was shining up through the lower window. The room was frightfully hot! Tubby, as soon as he was fully awake, stared down through the heavy glass pane. The dark surface of Jupiter, over which they were poised, stretched out as far as he could see in every direction. Directly underneath the window, like the huge mouth of a red-hot furnace, yawned a gap in the Jovian atmosphere from which lurid tongues of flame were licking upward into Space—venomous, scarlet-red tongues thousands of miles in length.

Tubby was awed as well as alarmed. They were dropping directly into the mouth of Hell!

"Don't be frightened," laughed Sir Isaac from behind Tubby's shoulder. "We're two million miles up yet and falling only at the rate of half a million miles an hour. That is the great red spot of Jupiter. I've always wondered just what it was. Those are tongues of flaming hydrogen. It proves conclusively that Jupiter is more like the Sun than any other Planet. Its surface is not solid on this side, and, as you see, it is internally heated to a very considerable degree."

While Tubby gazed, fascinated, Sir Isaac went on enthusiastically:

"Jupiter is partially self-luminous, which I have also always believed. And, because of its internal heat, the surface temperature is easily warm enough to sustain life, even out here so remote from the Sun."

"That looks absolutely *too* hot to live in," Tubby declared, gazing down into the crater of this mammoth volcano.

Sir Isaac laughed again; evidently he was in high spirits at this complete verification of his theories.

"Of course it's too hot on *this* side. I knew that, but I came around here to see the red spot. We had to follow it around, you see, because of the Planet's very rapid axial rotation. The surface, as I said, isn't solid. Nevertheless, since we know that Jupiter is inhabited, however much it would appear *not* to be, there must be at least a small portion of solid surface. We'll go around to the other side again and locate it."

"Like lookin' for land when flyin' over the ocean?" Tubby illustrated.

"Exactly. That is just what it can be compared to."

Tubby rose to his feet.

"Very good, perffessor. Very good, *in-deed*. You navigate us around, an' I'll go wake up Ameena. She mustn't sleep *all* the time. We got to eat."

#### Passing One of Jupiter's Satellites

THEY passed fairly close to Satellite IV. which revolves around its mother globe at a mean distance of 1,162,000 miles. They were then having breakfast, and during the remainder of the meal Sir Isaac entertained them with a most interesting dissertation on the nine satellites of Jupiter.

They were all three dressed as on the evening before, though Ameena had discarded the overcoat. She resumed it after breakfast, however, for when they had passed around over the other hemisphere of Jupiter, beyond the flames of the "red spot," exposed again to the cold of Inter-planetary Space and warmed only by a very small, pale little Sun, the interior of the vehicle rapidly cooled off.

After breakfast, an observation of Jupiter through the lower window showed only dense, black cloud masses.

"Let's go down, perffessor," Tubby suggested. "Can't see nothin' up here through them clouds." He added gloatingly:

"I guess we beat them Mercurians in, all right."

They entered the Jovian atmosphere about eight o'clock—at an altitude of 1,400 miles—a depth of air strata that surprised even Sir Isaac. Inky blackness surrounded them for a time. At 110 miles they emerged into daylight. Later all the clouds swept away. The pale Sun shown through the side window, rising over the horizon—for it chanced to be early morning on this portion of the mighty Planet—shortly after dawn of a clear, frosty-looking Jovian day.

"Looks awful chilly out," Tubby remarked dubiously.

"Yes," agreed Sir Isaac. "We would be freezing in here now if it were not for our friction in passing through the atmosphere. I have shut off our heating apparatus. . . . It will be much warmer down below, however. The internal heat of Jupiter warms its lower strata of air."

At an altitude of 25,000 feet they could distinguish quite plainly the Jovian landscape over which they were passing horizontally—a barren land that looked as though it might be thick black water and mud. It seemed to boil very sluggishly in spots. Here and there it appeared firmer—and there were curious vegetable growths as near like two hundred foot mushrooms as anything else Tubby could think of.

The landscape was changing constantly. Now they came over a barren, almost rocky land, with enormous trees like pines and cedars. Half an hour later the forests began occasionally to be dotted with cities—mammoth buildings rising in terraces two thousand feet into the air. . . . Everything seemed built on the same gigantic scale.

They selected, quite at random, one of the largest of the cities; and descended in an open space nearby. It was 9.50 A. M. when they came to rest upon the surface of Jupiter—a flight from Mercury, smallest major planet of the solar system, to Jupiter the largest, of exactly 34 hours and 5 minutes.

#### The Sky Party Meet the Great Mogul

THE audience with the Great Mogul of Jupiter—who came riding out of the city with his Wise Men on an enormous animal—like a queer-looking elephant with broad, very flat feet—took place about 12 o'clock noon Earth Eastern time, though it was by then late afternoon of the Jovian day.

It may seem remarkable that so great a dignitary would go to his visitors rather than bidding them come to him. The answer, however, is obvious to any thinking student. Tubby and Sir Isaac had flatly refused to allow themselves to be carried; and since gravity on the surface of Jupiter is more than 2½ times that of the Earth, they could hardly stand on their feet, much less walk!

The Great Mogul was a towering giant some fifteen feet tall, with his Counsellors in proportion. A robe of richly-colored cloth fell in folds to his feet. There were ropes of enormous gems about his neck—that is to say they might have been considered gems, though they looked more like little gargoyles moulded out of red and green putty and his braided white beard hung down his chest to his waist.

The audience was held in front of the vehicle, with Tubby, Sir Isaac and Ameena sitting on the floor in its doorway while a circle of guards kept back the crowd of giants that had collected. Within this circle the Great Mogul and his four Wisest Men stood.

Tubby felt as though he weighed over four hundred pounds—which indeed was the case; and his companions in proportion.

"It's just like being a Lilliputian in Gulliver's Travels" he whispered to Sir Isaac as the Great Mogul kneeled down to see him more closely. Tubby was struggling for breath; a great weight seemed compressing his chest; his head was ringing; his eardrums felt as though something were pushing them inward—all, as Sir Isaac had explained an hour before, because of the excessive pressure of the Jovian atmosphere. It was most disagreeable. And especially it was unpleasant to be nailed down by one's own weight—to be forced to interview the greatest monarch of the Solar System in an undignified sitting posture on one's own doorstep!

Sir Isaac beamed when Tubby made his remark about the Lilliputians. "Ah, so you *have* read my 'Gulliver's Travels?' There was a book! If I do say it myself, my scientific conceptions in that were—"

"Sh!" Tubby whispered. "He's talkin' to us!"

Tubby noticed suddenly that the Great Mogul and all his followers had very big, flat feet—shaped like snow-shoes—as though they were meant for walking on very soft surfaces. They—

The Great Mogul was talking in a huge, roaring voice. The words were strange, unintelligible.

Sir Isaac smiled with embarrassment; and shook his head. "Too bad," he whispered to Tubby. "I ought to know their language—but I don't. You see I've never written much about Jupiter. I—"

The little Jovian stepped forward—a stoop-shouldered, weazened individual no more than nine or ten feet tall. By his face he might have been two or three hundred years old. He looked more like a giant mummy than a man.

"I speak your Earth-language," he said. "All of

them—the languages of the Solar System are my study.”

Tubby felt impressed. He whispered to Sir Isaac:

“Looks like he’d been studyin’ too much, don’t he? Mean lookin’ guy, huh, perffessor?”

The Interpreter added:

“His Supreme Highness demands that you explain your mission.”

Sir Isaac did so, respectfully but eloquently outlining the nature of the disaster that threatened the Earth from Mars and Mercury, and ending by pleading most earnestly that the great Jovians lend their aid to the Earth to prevent so murderous an attack.

The Interpreter turned to his master and translated. When he had finished, the Great Mogul laughed!

The three voyagers knew then, before an answering word was spoken, that their mission to Jupiter was a failure. They had made their plea—the lives of all the teeming millions of people of the Earth were at stake—and the Great Mogul laughed!

“That dirty, mean——” Tubby would have broken into open villification, but Sir Isaac stopped him.

The Great Mogul was now speaking to his Interpreter.

“His Supreme Highness the Great Mogul is extremely sorry,” said the Interpreter a moment later.

“Yes, he looks it.” This from Tubby.

The Interpreter’s face darkened as he repeated this sarcasm to his master. A torrent of passionate anger swept over the Great Mogul’s face. The Interpreter listened to his words a moment; then, in translating them his anger made him lapse into an Earth-colloquialism more expressive than elegant.

“His Supreme Highness says all you little worlds can shoot yourselves to Hell for all *He* cares,” said the Interpreter.

Tubby tried belligerently to rise to his feet, but his weight made the effort a lamentable failure.

“We’re sorry,” Sir Isaac shouted at once. “Tell His Highness we meant no offense. . . . These Jovians are most hot-tempered people it would seem.” He added this last to Ameena in an undertone.

“Ask him about Saturn, Uranus and Neptune,” the quick-witted girl said immediately.

Sir Isaac put the question as humbly and placatingly as possible.

“They are uninhabited,” said the Interpreter sourly.

His Supreme Highness was making ready to depart, apparently without further interest in the proceedings. Tubby had almost managed to climb to his feet, but at last he gave it up and sank back again.

“Come on,” he panted. “Let’s get—out of this. . . . This ain’t no place for us—we’re wastin’—time again.”

Without further ceremony, like little disappearing manikins in a mechanical box, the three voyagers pulled themselves back out of the doorway of their vehicle and closed the door after them. Sir Isaac rolled across the floor of the instrument room—the easiest mode of locomotion—and hoisted himself into reach of the keyboard.

An instant later the vehicle, freed from the tremendous gravitational pull of Jupiter, flew like a rifle bullet into Space.

## CHAPTER VII

### In Which the Voyagers Pass Saturn, Uranus and Neptune, and Leaving the Entire Solar System Behind Them Boldly Launch Into the Outer Realms of Interstellar Space

**A** GAIN, after a voyage of some 450,000,000 miles the would-be saviours of their own world were doomed to disappointment! When they had again safely traversed the Jovian atmosphere, avoided Satellites II and IV with one of which they very nearly collided and were again launched into space, headed they cared not whither for the moment, the adventurers sat down to discuss this terrible misfortune.

As might be expected, the discussion yielded nothing. The miserable Jovian affair was most discouraging, though Tubby took a measure of satisfaction in it.

“I’m sorry for them Mercurians when they get here,” he declared, with a sudden grin at the thought. “I wouldn’t wish them no worse luck than askin’ a favor of that Mogul guy.”

“But what will we do?” Ameena asked. The brave little girl was extremely agitated as the possibility—even probability—of their final failure forced itself upon her. “Saturn, Uranus and Neptune are uninhabited! That leaves us nowhere else to go—and we *must* have help. We must!”

“I wouldn’t bet a plugged nickel on anything that guy said about them other Planets,” Tubby declared doggedly. “I say—let’s see for ourselves. It ain’t so much of a trip, is it?” Tubby, with Ameena’s hand to hold most of the time, was not finding the voyage unpleasant in the least.

Ameena flashed him a look of admiration as he made this sturdy suggestion. Sir Isaac pondered.

“We are now about 485,000,000 miles from the Sun,” he said thoughtfully. “Saturn’s mean distance is 887,098,000 miles; Uranus is 1,784,732,000 miles, and Neptune is 2,796,528,000 miles from the Sun!”

Tubby was slightly staggered; but he tried not to show it.

“That ain’t so far,” he declared. “Maybe we could speed it up a little out here.”

Sir Isaac, as the idea began taking hold of him, was making a swift mathematical calculation.

“We might go past each of them without stopping to land if they are not habitable,” he said finally. “Owing to their present positions it would be a trip of about 3,281,000,000 miles from here.”

He added:

“That’s nearly a third further than a direct route to Neptune owing to Saturn and Uranus being out of line.” He showed Tubby and Ameena his chart again. “However, we ought to be able——”

“Sure thing,” Tubby interrupted. “Let’s get goin’. We’re always wastin’ so much time.”

They were comparatively uneventful, the days that followed—uneventful that is, so far as astronomical occurrences were concerned. To Tubby, however, they were days of never-flagging interest. Sir Isaac, with his charts and his mathematics, concerned himself almost exclusively with navigating the vehicle. He had started on a rapidly-growing manuscript also—a sequel to the “War of the Worlds,” he said; and except for a brief game of poker in the evening, he left his fellow-travelers entirely to their own devices.

Tubby and Ameena cooked the meals together,



and washed the dishes; and, for relaxation sang their *Inter-planetary ducts*. For the rest, Tubby held her little hand, and with his arm around her awed into silence, they watched together the never-ending vista of glorious stars toward which the vehicle was falling with constantly accelerating velocity.

Now that their voyage was extended into such gigantic distances, Sir Isaac, more than ever before, felt the need of haste. Only fifty-five days and some six hours from the time they left Jupiter remained before the fatal opposition of Mars with the Earth. Much could be accomplished in fifty-five days; but still, as Tubby lugubriously remarked, at the rate they were accomplishing it, fifty-five days was a very little time. Wherefore Sir Isaac, setting his determined jaw firmly, hurled the vehicle with prodigious velocity onward.

The danger of collision, which had so perturbed Sir Isaac in the region of Minor Planets between Mars and Jupiter was now greatly lessened. They had plenty of room now—for Asteroids, Meteors, even Comets were seldom sighted. It was a run of some 460,000,000 miles to Saturn, through a region of space comparatively deserted.

### The Travelers Approach Saturn

AT their former maximum velocity of twenty-eight million miles an hour, which Sir Isaac now maintained as an average, sixteen hours after leaving Jupiter they were approaching Saturn. It was then half-past four the following morning. Sir Isaac had slept the afternoon previous and was on watch. He awakened Tubby; and Tubby went immediately upstairs and called Ameena. Shortly afterward all three were crouched over the instrument room floor window, peering down at the great Ringed Planet above which they were seemingly poised some twelve million miles away. Sir Isaac had decreased their speed materially so that they might make observations without approaching too close.

Saturn, a globe almost as large as Jupiter, and with its marvelous system of rings very much larger, at this proximity was a magnificent sight. The globe itself—a gigantic silver disc occupying half the firmament visible through the window—had broad bands of darkened area upon it similar to those the voyagers had observed on Jupiter. But those rings! Tubby and Ameena were amazed into silence; even Sir Isaac was awed by their splendor.

As viewed from the vehicle's present position, the concentric rings—the inner one somewhat darker—were opened up to an angle of nearly thirty degrees—a glistening, gleaming silver band, like the broad brim of a crownless hat encircling the Planet—a silver brim more than 37,000 miles broad, with a total diameter, including the sphere it encircled, of nearly 167,000 miles! Hanging there in space below them, the Planet, its rings and its several tiny moons bathed the interior of the instrument room with silver fire. It was the most glorious, most stupendous sight that human eyes had ever looked upon!

"Let us go down close," said Sir Isaac quietly.

A little later they could make out the composition of the rings with perfect clarity. Billions upon billions of tiny fragments of star-dust, each of them infinitesimal satellites, each of them like tiny moons reflecting the sunlight, whirled in their respective orbits about the mother Planet!

"The wonder of it!" Sir Isaac murmured. "A billion billion, and yet countless other billions of satellites—all on one identical plane, each separate, each holding its place and following its own circular orbit!"

Through the cloud-masses occasionally the on-lookers could distinguish the surface of the Planet itself—could observe that it also was in motion, moving in gigantic whirlpools.

"It is undoubtedly entirely liquid or gaseous," said Sir Isaac, "of a density very much less than water. We shall find no inhabitants here."

"No, I s'pose not," Tubby agreed. He seemed, for once, reluctant to proceed with the journey. He sat with his arm tightly encircling Ameena's waist—as who would not, with such a girl and such a sight before one? "I guess we got to get on our way," he added with a sigh.

### The Course Is Set for Uranus

SIR ISAAC altered their course; and in an hour more they were well on their way to Uranus, with Saturn and his rings high in the firmament above them.

It was a run of about eleven hundred million miles from Saturn to Uranus. Sir Isaac had already maintained an average velocity of twenty-eight million miles an hour for some hours. He now determined to better it. Beyond Saturn, he was convinced, there was still less chance of encountering any derelicts. And, with each passing hour—each passing Planet from which they hoped to obtain help for their own threatened world—the panic in their hearts grew.

It was Tubby who voiced it most strongly.

"In fifty-four days from today the Earth goes out of business," he remarked dolefully, from a deep, reflective silence into which all three had fallen.

"Fifty-four days and twelve hours," corrected Sir Isaac. "If we don't succeed."

"We shall succeed," declared Ameena. "We must never think but that we shall."

Thus, always, woman's stronger hope and courage never flags.

The run to Uranus occupied some 28 hours—an average velocity of a trifle over 39,000,000 miles an hour. It was about noon of the following day when, after no particularly unusual incidents—Sir Isaac again slowed down for them to make observations.

It had grown colder steadily; the vehicle's heating plant was in active operation. The Sun had dwindled to a little blazing point among the stars.

All that morning the travelers had sat looking downward, watching Uranus grow from a brilliant star to a little moon; from moon to glowing silver-green disc. And now, at noon when they slackened their fall, the seventh Planet of the Solar System lay beneath them.

After Saturn, the sight was disappointing. Uranus, 32,879 miles in diameter, lay perfectly barren. Its axial motion, observed closely over a period of time, was distinguishable—like the minute hand of a clock that creeps slowly forward. Sir Isaac believed it to be of some six or eight hours duration.

Heavy banks of cloud masses obscured the Planet's surface; Sir Isaac had not believed Uranus would prove to have an atmosphere—but it had, and a very

dense one obviously. But the surface of the Planet itself, what little they occasionally could see of it, was obviously liquid.

### Uranus Not Inhabited

"NO inhabitants here," said Sir Isaac. Quite evidently he was tremendously disappointed, for he knew that the average density of Uranus was not much more than that of Jupiter, and he had hoped that in this instance the Jovian interpreter had been lying.

"No inhabitants here," Tubby echoed sadly. "Well, let's get on our way."

Between the orbits of Uranus and Neptune there lies a mean distance of 1,011,796,000 miles—that is to say, something over a thousand million miles. Neptune now, however, was unfortunately very much further along in its orbit, so that the oblique course necessary to reach this latter Planet lengthened the distance to nearly eighteen hundred million miles. Sir Isaac, after a very abstruse calculation, announced the exact mileage to be seventeen hundred, and ten million and twenty-six.

Tubby was getting used to these gigantic figures, which as anyone can realize, are only relative. Sir Isaac pointed this out clearly.

"On Earth, in a railroad train," he said, "if you were going at the rate of fifty miles an hour and had a journey of 1,710 miles to make, it would not be very confusing to fathom the figures, would it? Or to calculate how long it would take you to make the run? That is exactly comparable to this run we have before us now, from Uranus to Neptune. We have about 1,710 million miles to go, and I propose to average about 50 million an hour."

Here Sir Isaac fell back upon one of his favorite topics. "All distances are relative to other distances. A mile to a snail is a long trip, but an airplane makes it in two or three dozen seconds. There is no such thing as absolute distance—or absolute motion, or time or size. Everything is relative to something else. Twenty-four hours is a very little time in the life of an elephant—but it is more than a lifetime to many insects. Our trip from here to Neptune is not more than an inch in all the countless miles of space. . . . But I'll tell you more about that some other time."

"Right," said Tubby, considerably relieved. "Just now we got to eat. Ameena's got lunch all ready."

The flight to Neptune occupied just thirty hours—an average of 57 million miles an hour. Sir Isaac was intensely pleased, though as he admitted to Tubby, the maximum velocity of the vehicle had never yet been tested.

Tubby and Ameena were also enthusiastic.

"Wonder what become of them Mercurians who was after us?" Tubby speculated. "Swell chance of them gettin' way out here."

"They must have stopped at Jupiter," said Ameena. "We were gone then—they could not tell where."

This, obviously, was logical. At all events, the Mercurian vehicle was now the least of their worries. Neptune lay beneath them. Would they secure, on this far outpost of the Solar System, the help they needed? Fervently they prayed so, for it seemed their last chance.

### The Sky Fliers Approach Neptune

IT was just 6 P. M., on the day following their departure from the vicinity of Uranus, when Sir Isaac held the vehicle poised above the surface of Neptune. The Planet, very slightly smaller than Uranus, lay completely enveloped in its dense atmospheric envelope.

"We got to go down," said Tubby frowning. "Can't see nothin' from way up here."

The descent through Neptune's atmosphere was pleasurable, for the friction warmed the vehicle once more to comfortable temperature. At an altitude of some fifteen thousand feet they emerged from the dense cloud-banks into Neptunian daylight. And what a dim, miserable daylight it was! And below, what a bleak, dreary sight met their disappointed gaze! With sinking hearts—their last hope gone—they stared downward. Neptune's surface—flat, unmarked by a single distinguishing physical conformation—might have been the surface of a polar sea! In all directions, to the circular rim of the raised horizon, stretched a level surface of grey-white snow, dirty-looking in the twilight which was Neptune's day. But whether land lay beneath, or merely some frozen liquid, could not be told.

There was not a sign of life—nothing but bleak desolation. It was an amazing sight—an old world seemingly, when everything in the logic of Sir Isaac's scientific mind had led him to anticipate a new one—a world of heat, of liquid or gas turbulent from its own internal fire.

Sir Isaac muttered to himself. Looking upward through the side window with Tubby, they saw the Sun through a rift in the clouds—a tiny pencil-point of light in the dull, reddish-blue sky—a dreary, remote Sun, hopelessly impotent to light or to warm this far-away offspring.

Tubby's face was solemn as he turned to his friend.

"Ain't no use goin' down no farther. That's our finish—that puts our Earth out of business."

Silently the vehicle, with its three saddened, frightened occupants, ascended through the Neptunian atmosphere, again into space.

"Well," said Tubby finally. "Now what? That's the end, ain't it?"

Again it was Ameena who first recovered her courage. Her lips were compressed; her beautiful, dark eyes blazed with determination.

"It is *not* the end, my friends! To such men as you the end never comes before defeat!"

She pointed to the Stars blazing outside the window—the band of "Milky Way," a myriad stars brighter now from this outer edge of the Solar System—and added:

"*There* are other worlds—countless other worlds. Let us go to them! With all the haste we can make—forgetting danger to ourselves—let us hurry. Here at home, in our own little Solar System, we have been rebuffed. But somewhere in this Universe there must be humans who are unselfish—who though without hope of reward, still will not suffer their own kind to go down into disaster and death!"

Her enthusiasm was contagious.

"Come on!" shouted Tubby. "Let's get goin'! There's a big star—let's go to that one!"

Sir Isaac thumped his fist on the table.

"We will!" he exclaimed. "I shall attain a velocity

never before even imagined! We must—we shall find help for our Earth!"

A few moments later, sweeping circularly around Neptune, the undaunted adventurers left the Solar System behind them and launched themselves boldly out into the uncharted realms of Inter-stellar Space!

## CHAPTER VIII

### In Which, En Route to Alpha Centauri, Sir Isaac Explains the Structure of the Universe and Plunges Into the Most Abstruse Mathematical Calculation Ever Attempted by the Human Mind

"WE must not rush into this thing thoughtlessly," Sir Isaac declared, when the first flush of their enthusiasm was passed and practicality began to creep in. "We must plan—calculate. Our time is limited. We only have——"

"Fifty-two days exact," Tubby finished. "How far we got to go? Ain't we gone a good ways already?"

Sir Isaac had made several brisk computations a few moments before. Neptune, with the entire Solar System behind it, already hung far above them. They were falling downward, apparently toward a very bright Star which gleamed amid a myriad of its fellows in the lower firmament.

"We have relatively a very great distance to go," said Sir Isaac, answering Tubby's question. "We are already on our course to the nearest of all the Stars—and fortunately we happen to be at that extremity of the Solar System nearest to it." He pointed to the lower window.

"Very good," approved Tubby as usual. "The closest Star. Very good. What's its name an' how far away are we? An' say, what's a Star anyway? We been dealin' in Planets so long——"

Sir Isaac smiled. "To answer your last question first, I shall have to give you a brief explanation of the nature of the entire Universe."

Anticipating a somewhat lengthy dissertation of the sort Sir Isaac seemed to delight in, Ameena settled herself beside Tubby and gave him her hand to hold.

"Go on, Sir Isaac, please do," she pleaded.

"Go ahead—shoot!" said Tubby.

Thus encouraged, Sir Isaac began:

"The region we call Space is a limited area whose boundaries I shall explain some other time."

Tubby and Ameena were anxious to know.

Sir Isaac frowned slightly. "Oh well—that is immaterial. In that scientific narrative I dealt with infinite smallness, and now we are dealing with infinite largeness. The theory is the same. . . . However, this region we call Space is devoid of air. It is not, of course, a vacuum, but is completely filled by the ether."

"What's that?" demanded Tubby.

"The ether, my friends, is an agglomeration of imponderable atoms, which, relatively to their small dimensions, are as far removed from each other as are the Celestial bodies in Space. It is these atoms which, by their vibratory motion, produce both light and heat in the Universe. . . . That's my own definition. I hope you like it?"

"It's—it's beautiful," declared Ameena.

"Thank you," replied Sir Isaac, smiling graciously.

"I think it is rather neat. I've used it frequently. Though lately, these foolish modern scientists of Earth are beginning to dispute me. . . . Well, to proceed. In this region of Space, billions upon billions of Celestial bodies are whirling. They all obey recognized laws of Celestial mechanics—all are acted upon by different balancing forces. . . . I shall not weary you with that."

"No," said Tubby. "We'll pass that up. Go on."

"These Celestial bodies range in size from the most gigantic blazing Suns, millions of times in volume of our own Sun of the Solar System, down to the very minutest fragment—which is nothing more or less than an atom of the ether itself!

"We call these Celestial bodies by different names. A Star, for instance, refers to luminous bodies. Our own Sun is one of them. Planets are reflecting, or partially self-luminous bodies revolving around a central Sun. You already understand what Satellites are. Then there are Asteroids, which are merely Planetoids—smaller Planets. And there are Comets, and Meteors, and——"

"Never mind all them," Tubby interrupted hastily. He squeezed Ameena's hand consolingly as Sir Isaac plunged on:

### Other Worlds Than Ours

"THEREFORE, you understand, we live on one of the Planets—I beg your pardon, Ameena—on two of the Planets of the Solar System—the Earth and Venus. Our Sun, with all its Planets, forms only *one* System of an infinite number. Each of those Stars—" He waved his hand again toward the window—"Each of those Stars very probably has revolving about it a system of worlds much greater than our own 'Solar System.'"

"My goodness," Tubby commented. "This here Universe is a big place, ain't it? We only got started, so far."

The memory of those fifty-two days of grace which were all that remained to them, struck Tubby forcibly. He added anxiously:

"How soon do we get to this first Star, professor?"

### The Space Flyer Is Headed for Alpha Centauri —the Nearest Star

SIR ISAAC referred to a memorandum. "The nearest Star to the Solar System is Alpha Centauri," he answered. "The Astronomers of Earth recently claim to have found one slightly nearer, but I do not recognize it. That is Alpha Centauri we are heading for—a splendid binary of the First Magnitude, with a parallax of 0.75" whose components revolve in 81 years. I mean—" he added apologetically, "it is really two Stars several hundred million miles apart, revolving around each other. It is drifting through Space with a velocity of some sixty miles a second."

Tubby lifted his eye-brows; Sir Isaac continued hastily:

"Every Star is moving—drifting, I call it—as though they were in gigantic currents circulating about—I don't know just whither or why. Our own Sun, for instance, with all its Planets, is drifting—floating toward some of the Stars and away from others—at the rate of many miles a second, but always holding its mass of Planets intact."

Tubby turned to the girl beside him. "Kind of complicated, ain't it, Ameena?" Then to Sir Isaac:

"How far is this closest Star we're headin' for? I ast you that, an' you—"

"I was getting to that. But if you *must* know at once—" Sir Isaac spoke with some asperity. "If you insist, I'll tell you that Alpha Centauri is a trifle less than 25,000,000,000,000 miles from here!"

Tubby and the girl stared blankly as Sir Isaac stated this astounding figure.

"You see? I knew you would not understand me. What I wanted to explain first, was that in dealing with these larger figures, to save confusion we generally use a larger unit than the mile. The best one is the Light-year. It is the distance light travels in a year."

"How far?" Tubby asked, with rapidly recovered poise.

### The Professor Explains Meaning of Light-Year

"LIGHT travels about 186,000 miles a second," said Sir Isaac. "Multiply that up to a year and divide it into 25,000,000,000,000 and you get 4.35. A child could do that by simple arithmetic. Thus you find that Alpha Centauri is distant 4.35 Light-years."

This latter figure was considerably less awe-inspiring. Tubby seized it eagerly.

"Only four Light-years. That ain't so far."

"No," said Sir Isaac, smiling with returned good humor. "Comparatively speaking, of course, it isn't far. All distance is relative. If you can travel fast enough, 4.35 Light-years, especially compared to the many hundred Light-years which separate some of the Stars, is relatively quite near. . . . Now about our own velocity—"

It was, in truth, the problem of attaining a sufficiently great velocity to cope with these greater distances that had worried Sir Isaac from the moment they decided to launch out into Inter-Stellar Space. Within the comparatively narrow confines of the Solar System—menaced by Asteroids and Meteors—a great velocity was neither necessary nor desirable. But now—in the outer realms—it was both.

Sir Isaac, in spite of his bombastic statement to Tubby as they left the Earth, had never really anticipated a prolongation of the voyage beyond Neptune. Nevertheless he had always believed that the vehicle's velocity, theoretically, was illimitable. Several factors contributed to this conclusion. It is one of the laws of motion, inertia to be exact, that a body once in motion and not acted upon by any force, will continue forever in motion at exactly its original rate. Thus, whatever force was applied to the vehicle must *accelerate* its rate of speed indefinitely.

The entire Solar System now lay above them, and thus the combined repellent force of all its Planets and its Sun could be used. This, with the attractive force of all the countless gigantic Stars that lay below, Sir Isaac was confident would cause them to fall into the void of Space with tremendous velocity—a velocity that had no limit except the time allowed for acceleration.

Haste was needed, and now, for the first time since leaving the Earth, Sir Isaac used almost all the total force at his command. They had left the vicinity of Neptune about 8 P. M. At midnight, just when the sleepy Ameena was about to retire, Sir Isaac looked up from the most complicated calculation he had so far made.

### Speeding Through Space at 200,000 Miles Per Second

"OUR velocity is now approximately two hundred thousand miles a second," he announced triumphantly.

"Thousand!" Tubby exclaimed in dismay. "We was goin' in millions this afternoon!"

"I said a *second*," Sir Isaac returned. "We did attain—at one short period last night—about a hundred million miles an hour. But I cut it down at once. This is per second—not per hour."

"Oh," said Tubby with relief. "How much is that an hour?"

"About seven hundred and twenty million—that is to say, seven times our former maximum."

This was joyful news indeed; but Sir Isaac's next words dispelled the joy completely.

"At this rate," he added, "we should reach Alpha Centauri in about four years!"

And in fifty-two days Mars would destroy the Earth unless they were back there to prevent it!

"But—but then—" Tubby protested. Sir Isaac's quiet smile stopped him.

"You need not worry over that," he said. "There are many forces acting upon us which you do not understand. The acceleration of a falling body is an astounding ratio—especially when it has an additional repellent force above it. . . . I've told you that before. Wait until tomorrow—then we shall see."

There followed a somewhat lengthy silence.

"Say, pefessor," Tubby began finally, "ain't this kind of re-mark-able—this extra speedy travelin'?"

Sir Isaac looked up from his mathematics. "My dear fellow, I *do* suppose these Astronomical figures confuse you. I've already tried to explain—"

"No—I mean, *us* bein' able to go so fast." Sir Isaac laid aside his pencil, and frowned. "I see nothing extraordinary in it. Your mind is still in its Earth-rut. You must get out of *that* line of thinking."

"I will," Tubby declared humbly. "Only tell me how to."

Sir Isaac's good nature returned, promptly as usual. He laughed.

"You must understand that on Earth you have always been dealing—personally, I mean, with mileage the longest distance of which is the circumference of the Earth—25,000 miles. All your life you have been a little ant, chained down by gravity. Naturally, for you, motion has had a very narrow meaning. Your own motion, in relation to the ground beneath you, is all your mind daily recognized. That, for you, was the standard of motion.

"But, my dear friend, that is not really motion at all. You were like an ant, crawling around the narrow limits of its little world. How can you expect an ant to understand, or to fathom the velocity of an airplane, or a rifle bullet, which covers in a fraction of a second, a space—a distance—equal to the entire known world of the ant?"

Sir Isaac was gradually warming up.

"You call that motion. On the other hand, though you did not know it, perhaps, both you and the ant have always been moving with great rapidity. For instance, the rotation of the Earth on its axis, if you happened to be on the Equator, would carry you around a circle of 24,000 miles in one day—every day. That is a thousand miles an hour. Added to that, the Earth also moves around in its orbit some

66,000 miles an hour. Still more than that, the Sun drags the Earth along at about 36,000 miles an hour. This motion of the Sun can only be calculated by its relation to the other Stars. And, so far as I know, the whole Universe may be hurtling through Space a thousand times that fast. In fact, I think it is. And still more than *that* probably Space itself is moving—a million times faster than everything else. . . . But that you cannot understand yet. . . . I'll explain *that* to you later."

"Tell me more," Tubby murmured desperately.

"Well," said Sir Isaac, "In Space you see, all Earthly ideas of motion must be reconstructed. We are now a Celestial body ourselves—obeying all the laws of Celestial Mechanics—a little world all our own—a world of three inhabitants."

It was an interesting thought; it aroused in Tubby a sudden patriotism for the vehicle and its welfare.

Sir Isaac went on quietly and earnestly: Some of the Stars are drifting at the rate of 250 miles a second. *Drifting*—you understand. But we are not drifting, we are *falling*—pulled down by attraction from below and pushed down by repulsion from above. Is it any wonder then—after falling freely for millions of miles, and with such a constant, tremendous impulse—that we should attain an enormous velocity?"

Both Tubby and Ameena admitted the reasonableness of this. Motion, as Sir Isaac so clearly pointed out, depended entirely upon the motion of something else with which you compared it.

"I guess it ain't so wonderful, perffessor," Tubby said finally. "But you got to get used to thinkin' about it."

Sir Isaac smiled, and turned to the tired girl. "Hadn't you better run along to bed, Ameena?"

Tubby escorted her to the foot of the stairs. As he parted with her for the night, she said softly:

"Do not worry, Tubby dear. We shall succeed—I know it."

With a radiant smile she kissed him goodnight and darted up the stairs. For an hour thereafter Sir Isaac's figures fell upon deaf ears; the memory of Ameena's beautiful face and the tenderness in her voice—attributes that had all the inherited intensity of hundreds of Venus-women ancestors behind them—absorbed Tubby's entire consciousness.

During the night, Tubby and Sir Isaac alternated keeping watch, though as usual Tubby did most of the sleeping. Poor Sir Isaac was getting thinner than ever; but his wonderful courage and vitality held him up. He was almost always either working with his calculations, or using some of the many scientific instruments with which the room was equipped; and, for diversion, writing his manuscript, which hourly grew in bulk.

#### The Professor Writes a Narrative of the Trip

HE was engaged in this latter occupation the following morning after breakfast, when Ameena, coming in from washing the breakfast dishes, timidly asked him what he was writing. He looked up to her with tired eyes as she and Tubby, with arms around each other, stood beside him.

"I am writing a scientific narrative which I think I shall call 'Around the Universe,'" he said quietly.

Ameena clapped her hands. "Oh, isn't that fine? All about our trip! Will you publish it on your

Earth? Everyone will love to read about all these wonderful things, won't they?"

Sir Isaac's smile was very gentle, slightly cynical. "My dear child," he said, "you do not understand human nature. People may condescend to read what we have done, but do you think they will *believe* it?"

"But, of course, they *must*," the girl cried. "Is it not actually happening to us?"

Sir Isaac sighed. "It is, most certainly. But people are so skeptical. They do not even believe that Jupiter is habitable. They will think I made it all up—treat it as a joke. All my scientific data—my personal observations—the most wonderful Astronomical—"

"Let 'em go to blazes," Tubby put in fiercely. "We'll give it to Venus. If them Earth-people ain't got no more sense than—"

"But first we must save the Earth-people, or those terrible Martians will destroy them," reminded Ameena.

Tubby sobered. "That's so." Another thought struck him. "We'll save all them Earth-people from gettin' murdered—an' then they'll laugh at us for tellin' them how we did it! That's gratitude for you! That's—"

Ameena kissed him gently. "Never mind, Tubby. We shall do what we can—for the sake of humanity—without hope of reward."

Sir Isaac, practical as always, remarked somewhat cynically:

"To accomplish that, we must have help. We must find some other humans in this Universe as unselfish as ourselves. Can we do that? I doubt it."

"You are extreme, Sir Isaac," Ameena said. "On your Earth, when you have had war, have not Nations aided each other?"

"Yes," he answered. "But only for their own interest—for their own defense. I cannot recall a single instance of real unselfishness. Yes, I think there were two. A few years ago there was a *little Nation*—"

"A little Nation!" Tubby exclaimed. "Say, maybe that's the answer! Maybe we was wrong to pass up all them little Planets between Mars and Jupiter!"

"I thought of that," Sir Isaac responded. "A small Nation or a world, I think, is more likely to be completely unselfish. I don't know why it should be so—but it seems to be. There are Ceres, Juno, Pallas—many Minor Planets—and we ignored them all." He shrugged. "You see, a little world, however willing, would be powerless to help us materially anyway—even if they wanted to. That is why I did not consider them."

The train of thought which this conversation brought to Sir Isaac worried him afterward very considerably. In drawing an analogy between individual Nations and Planets, it became perfectly clear that to ask aid of any Nation is a very different matter from going to another world. Nations on the same Planet have infinitely diversified interests interwoven. War comes. However unselfish a Nation may appear—may in fact really and sincerely in its heart feel itself to be—it cannot by the very nature of things, be wholly detached. But go to another Planet. The detachment is complete. Then—and then only—can you put it to the real test of altruism.

Thus the identical attitudes of the people of the Light Country of Mercury, and of Venus, and Jupiter, while they cannot be condoned, at least can

be understood. And following this train of thought, as Sir Isaac did that morning while he sat staring with unseeing eyes at his neglected manuscript, an additionally disturbing conclusion was inevitable.

All the Planets the voyagers had so far impertuned, belonged to the Solar System. To some extent, therefore, their theoretical interests were mutual. And, if Mercury, Venus and Jupiter were willing to stand by and see the War Lords of Mars overrun the Earth, how much more likely were worlds far outside the Solar System to adopt a similar attitude? Sir Isaac pondered this, until at last he began to realize how inevitable would be their rebuff, no matter where in the Universe they went.

Noon came. Sir Isaac ate moodily, then went back to the instrument room and his gloomy reverie. Ameena put the kitchen in order with Tubby's help, after which the two young people sat in the store-room, Ameena strumming her lyre and Tubby singing with enthusiastic abandon.

It finally became too much for Sir Isaac's overwrought nerves.

"Won't you *please stop*?" he called querulously. "I can't *stand* that infernal noise when I'm thinking."

They stopped obediently; and a moment later joined Sir Isaac.

"How we makin' out perffessor?" Tubby asked timidly. "We're sorry we disturbed you—this here house is so awful quiet."

Sir Isaac was never one to hold rancor.

#### Speeding on at 45 Million Miles Per Second

"**WE** are doing very nicely. Our per second velocity now is approximately 45 million miles. At this rate we would reach Alpha Centauri in about six days. I shall, however, do much better than that—our rate of acceleration is quite satisfactory."

But Sir Isaac only shook his head and went back to his reverie.

It *was* a futile thing—Sir Isaac smiled cynically to himself at the thought of it. The Stars themselves would not be inhabited since they were blazing Suns. Hope only remained with their individual Planets; and to locate these Planets and land upon them would consume much more time than the meagre 51 days of grace that were left.

A very real problem of Celestial Mechanics showed Sir Isaac the mathematical impossibility of landing upon more than two or three additional Planets at the most, in such a time. The vehicle, during these many hours that Sir Isaac had remained lost in thought, had accelerated to a velocity of some two hundred million miles a second—enough to take it far beyond Alpha Centauri in a very few days—especially since the acceleration was constantly progressing. But more than twenty-four hours had been consumed in attaining this velocity; and to check it entirely, under similar conditions would require an equal length of time. But suppose Alpha Centauri had no planets! Or suppose the Planets were not inhabited? To go to the next nearest Star would require many days more—a still higher velocity—a still greater loss of time in starting and stopping. And then the actual time necessary to land upon a Planet—the slow descent through its atmosphere—the ascent, and hours afterward proceeding at a snail's pace such as they had used within the Solar System! No, it was impossible. A year

would be required to make any extended exploration—a year at the very least.

"I *will* figure it out," he muttered grimly. "The most delicate, abstruse mathematical problem ever attempted! But it *can* be solved—and I will—I *must*—solve it."

#### CHAPTER IX

##### In Which the Voyagers Plunge Into the Darkness Beyond the Milky Way, and Two Most Felicitous Events Occur Simultaneously

**T**HE car passed between the component stars of Alpha Centauri during the early afternoon of the following day. The two gigantic blazing suns were four times our own sun in apparent diameter. Their light was intolerable to the naked eye. Even with the shades of the side windows drawn, the interior of the vehicle was disagreeably bright.

The heat was tremendous—almost stifling. All that morning the temperature had been rising, until, at lunch time the two men again appeared in their white flannels, and Ameena was back to her charming native costume.

During the morning the two stars that compose Alpha Centauri had visually separated, and Sir Isaac laid his course between them—a thing that was possible only because the vehicle's tremendous velocity precluded even these gigantic masses from drawing it aside and into them.

The actual passage between the stars was very brief, fortunately, or the voyagers would have perished in the intolerable heat. Sir Isaac estimated the stars to be some 3,600,000,000 miles apart. He professed ignorance as to what figure the earthly astronomers had set, and admitted his estimate probably was greatly in error since he had nothing to judge it by save the stars' apparent flight upward past the side windows. It was indeed, only a few seconds before they were above the vehicle and visually again drawing together.

When it was over, Sir Isaac, trembling at the keyboard, turned his white face to his companions and smiled weakly.

"I should not have tried that," he said. "It was too dangerous, attempting to pass through that little space. How I ever managed it——"

He broke off, adding:

"Well, we're past now, at all events. I did not want to slow down—but suppose—just suppose we had run too close to one of those stars—suppose we *had* collided with one of Alpha Centauri's planets?"

"Was there any planets?" asked Tubby. "I didn't see none."

"Neither did I," Sir Isaac confessed. "I did not see anything. There might have been—I do not know." He took a swallow of water from the carafe on the table, lighted a cigarette—he was smoking incessantly—and went back to the mathematics in which he was now constantly engaged.

Tubby watched him timidly for a moment. Then, encouraged by a glance from Ameena, he said, hesitatingly:

"Where we goin' next, perffessor?"

Sir Isaac looked up, frowning. "Eh? What's that?"

"I said, where we goin' next? You said this mornin' we wouldn't stop at Alpha Centauri, but you forgot to tell us *why*."

Sir Isaac, still working on his plans, had made a brusque statement to that effect. He had promptly immersed himself in his mathematics again, so Tubby and Ameena had thought it best to let him alone temporarily. They had spent almost the entire morning together in the little observatory upstairs, where, through the small telescope they had tried to locate the Solar System.

Sir Isaac, during the morning, had reached a definite conclusion; and now in the face of Tubby's ingratiating attitude, his austerity melted a little, and he retailed his plans.

#### Sir Isaac Tells His Plans

"I DID not stop at Alpha Centauri," he said, "because I calculated that the time we would lose in checking our present high velocity and starting again, would, after a very few stops, exhaust all the time at our command." He smiled in friendly fashion, and explained in detail.

"But then," protested Tubby, "if we don't never stop, how are we goin' to get any help?"

Sir Isaac hesitated. "To be quite frank with you, my friends, I have about concluded we cannot get any help."

"Oh," said Tubby.

"Oh dear," Ameena echoed faintly.

Sir Isaac continued.

"I think we can save our earth alone—through our own efforts—without any outside assistance."

Coming from such a meticulous person as Sir Isaac this was good news indeed. Tubby and the girl vociferously demanded details.

Sir Isaac raised his hand. "I have not worked it out yet. That's why I didn't want to tell you anything about it. The plan involves a tremendous, a very abstruse and delicate mathematical calculation. If I can secure complete and exact enough figures the execution of my plan will be very simple. I am working on the calculation now. I worked all last night—all this morning. It may require many days—I do not know. But if only my strength holds—"

"You go right ahead," encouraged Tubby. "We won't bother you none. And meantime—"

"In the meantime," Sir Isaac supplied, "I thought we might as well go onward." He smiled with just a touch of embarrassment. "To tell you the truth, I am very curious about these outer realms of space. I have lots of good theories—but I really *know* very little about this portion of the Universe."

"Me neither," Tubby declared liberally.

"And," Sir Isaac went on, "since we have attained this high velocity, and are each moment accelerating it, I thought we might as well utilize our spare time to—well just to satisfy our curiosity. I have a theory regarding the edge of Space—"

"Ah! The edge of Space!"

"Yes, the very ultimate edge of this Space we are traversing. If we could reach it and return with my calculation completed, and then save our Earth, it would—"

"Great!" cried Tubby.

"We can! We will!" cried the girl.

"—it would gratify me very much," Sir Isaac finished.

Thus it was arranged. Tubby and Ameena returned to the observatory—the only part of the ve-

hicle where they could sing with abandon and without fear of disturbing Sir Isaac.

Two hours later they came quietly down to indulge in afternoon tea. In the instrument room, sprawling in his chair, with his arms on the table and his head upon them in the midst of a litter of papers covered with algebraic hieroglyphics, sat Sir Isaac, fast asleep.

"Poor dear man," murmured Ameena. "He is completely worn out."

"Yeh, he's all in," agreed Tubby. "Let's get him to bed."

They awakened him gently, and ordered him up to one of the bedrooms. Like a child, he obeyed. On the stairs he roused himself sufficiently to caution Tubby.

#### Speed and Danger Increase Apace

"I WANT you to look ahead through the floor window at least once **every minute**," he declared. "We have very little room, **even** out here, at this velocity. I have several times barely avoided collisions that I haven't told you about. If we approach closer than 900,000,000 miles—or even as close as that—to any celestial body of sufficient mass to deflect us, we are lost. Will you promise?"

Tubby promised; and this time, with Ameena's assistance, he kept his word.

As Sir Isaac explained to them the following morning, the danger of collision in one way was now very great, though in another way it had lessened. They had passed Alpha Centauri at a velocity per second of something like 275,000,000 miles. This by steady acceleration, now approximated 740,000,000. Any very gigantic celestial body in front of them would deflect them aside and into it. It was this danger that they must avoid. But of course, so enormous a body would be visible an enormous distance away and so could be seen in time to be avoided.

On the other hand, there was now little danger to be apprehended from smaller bodies such as the asteroid with which they had so nearly collided back in the Solar System. Even if one of these should separate itself from the proximity of the larger worlds, its comparatively minute mass could not exert sufficient attractive force to make the slightest deflection in the course of the vehicle. For a collision to occur, therefore, one of these smaller bodies would have to lie *exactly* in the vehicle's path—a space of some forty feet which was the vehicle's width. And, as Sir Isaac remarked, any particular forty feet in these vast realms of outer Space was too small to be considered. Sir Isaac also pointed out that any asteroid would be invisible until it was only a fraction of a second away at this velocity. A collision with one was a blind chance which they could not avoid taking.

Twenty-four hours after passing Alpha Centauri the voyagers found themselves distant from the Earth some 15½ light-years. Sir Isaac left his mathematics for an hour that afternoon to point out to his friends places of interest in the Heavens.

The firmament now shone with dazzling brilliancy, though the faint stars of the Milky Way still seemed as far away as ever. The sun of the Solar System—its planets quite invisible—had dwindled to one of the faintest of all the stars in that region. Alpha Centauri, visually quite near the sun, was infinitely

brighter, but still it was surpassed by many of its fellows.

### Tubby Gets a Few Comparisons

SIR ISAAC, passing from one window to another, pointed out the red stars—Antares, most deeply colored of all—Betelgeuse, Aldebaran and Arcturus. Tubby wondered if any of these stars were as large as the Sun, or whether it was only on account of their closeness they looked so much brighter. Sir Isaac laughed with genuine amusement.

"They are somewhat larger," he said ironically. "Take Betelgeuse, for instance. There's our Sun—there's Betelgeuse. Our Sun is about  $15\frac{1}{2}$  light-years from here—Betelgeuse is about 150 light-years!"

"He—he must be lots bigger, then," Tubby concluded after a moment of amazement.

"He is," said Sir Isaac. "Professor Albert Michelson measured the diameter of Betelgeuse in the autumn of 1920. His figures show that star to be equal in size to 27,000,000 Suns like ours!"

Tubby was staggered. Sir Isaac went on calmly.

"The diameter of Betelgeuse is 260,000,000 miles. Let me show you how really enormous that is. You remember our trip from the Earth to Venus, and to Mercury? Well, if Betelgeuse were a hollow globe and you put our Sun suspended in its center, Mercury, Venus and the Earth would all have plenty of room to traverse their orbits inside it! Even the orbit of Mars would only be a short distance outside!"

Neither Tubby nor Ameena could think of anything to say.

"Professor Michelson found all that out by what he calls the 'Interference Method.' I won't bother you by explaining it. . . ." Sir Isaac raised his hand despairingly. "Of course Michelson deserves a lot of credit. I never had occasion to work on just that particular problem, or I would, of course, have been able to——"

"Show us somethin' else," Tubby interposed.

Sir Isaac pointed out several binaries that now were visually separated. It was all a most wonderful sight; the multiple stars—"clusters"—and the curious spiral nebulae, the still faint, far-off Milky Way. It was indeed a stupendous, awe-inspiring sight, though Tubby and Ameena were now sufficiently used to it, to be comparatively unimpressed.

For nearly a week the vehicle, with steady acceleration, dropped into Space, while Sir Isaac worked almost incessantly at his computations and Tubby and Ameena engrossed themselves in each other's companionship.

They entered the Milky Way on the seventh day after passing Alpha Centauri. Though their actual entrance into the Galactic Plane was unmarked by any visual phenomena—the firmament blazed with stars as usual—a different set of stars were now brightest, but to the non-technical observer there was no marked change.

During this week an apparent star motion had gradually increased, until now, looking down through the lower windows, the stars could be seen opening up as the vehicle dropped into them—separating themselves, passing upward, across the side windows, and closing together again overhead.

"How fast we goin' now, peffessor?" Tubby asked once.

It was at supper time. Sir Isaac hastily masti-

cated a huge mouthful of cheese sandwich and washed it down with a swallow of coffee, before replying.

"I cannot tell you in miles," he answered. "In light-years I estimated it this morning to be about  $1/120$  a second. That is,  $\frac{1}{2}$  light-year a minute, or about 720 a day. We are now about 3,500 light-years from the Earth.

Tubby had by this time made up his mind never to be surprised again at anything.

"That's an awful lot faster than we used to go, ain't it?" he remarked. "Around Mercury or Venus, f'r instance."

Sir Isaac's smile was condescending.

### Tubby Gets Dope on Real Speed

THE diameter of the entire Solar System, from Neptune's orbit, across the Sun, and out again to Neptune's orbit on the other side is a mean distance of 5,593,056,000 miles. We are traveling that distance now just about once every second!"

Probably no other statement of Sir Isaac's was so amazing. And, as Tubby and the girl pondered it, the immensity of this Space through which, day after day, night after night, they were plunging at this almost inconceivable rate, was made clear to them.

Sir Isaac added laughingly:

"The Solar System isn't very large. Why, that star Betelgeuse could hardly turn around in it. A mere 5,500,000,000 miles,—it's only a few times the diameter of that one star."

How Sir Isaac ever avoided the stars of the Milky Way, even with the gigantic distances separating them, he never understood. All that night, his still elusive calculation neglected, he sat at the floor window in the instrument room. From time to time he leaped to the keyboard to alter their course. It was a nerve-racking, horrible night. But in the morning, when Tubby, and a little later, Ameena appeared, the Milky Way lay glistening above them. Below, only a few stars showed; beyond that, darkness—blank, unfathomable.

Sir Isaac greeted his friends with a wan smile; he was on the verge of physical exhaustion, but his spirit remained undaunted.

"We are beyond the stars," he said. "It is as I always thought. Even from Earth I have telescopically observed a perceptible thinning out of the Celestial bodies. We have reached the limits of our Celestial Universe on this side. We have now below us only empty Space—unless we encounter another Universe."

Sir Isaac quite evidently had his own theories as to what lay beneath them in that void of darkness. But he smilingly resisted all Tubby's efforts to make him talk about it.

Finally in desperation, Tubby exclaimed:

"We ain't got no business goin' much farther. The opposition of Mars comes off in forty-two days from 6 P.M. tonight—an' we're gettin' a fair distance away from the excitement."

Sir Isaac smiled confidently. "We shall return without a stop—quite in time, even at our present speed. That isn't worrying me. It's——"

"Your calculations?" supplied Ameena. "Your great plans of which you will tell us nothing? How are they progressing, Sir Isaac?"

His face clouded. "I have been so busy," he said somewhat anxiously. "But I'm making progress."



Now that we are beyond the stars, I will have more freedom—will redouble my efforts.”

Poor Sir Isaac, for all his eagerness to work, was forced to retire immediately after breakfast for a few hours of much needed rest. They awakened him for luncheon—which he gobbled in haste—retreating at once to the instrument room, where by the light of the table electrolier, he became instantly immersed in his interminable figures.

Thus, in similar fashion, while the vehicle plunged onward through Space at a velocity sufficient to take it across the 5,593,056,000 mile diameter of the Solar System in very much less than one second, fifteen more days and nights of interminable voyaging went by!

### Exploring Outer Space

THE Universe of which our Solar System is so minute a portion, had long since faded into invisibility. Others had been distantly sighted on both sides, and passed overnight—reduced by comparison into mere nebular regions, though each may have been as large, or larger than our own Universe.

On the fifteenth day, skirting alongside a smaller Universe—possibly no more than a thousand light-years in diameter, Sir Isaac announced that they were approaching the end of their outward voyage.

The vehicle was still dropping to that vast void of silence and darkness with a velocity now quite beyond calculation. It was a decreasing velocity, now, however, for, sometime since, Sir Isaac had begun to retard it.

Overhead, the last starry firmament was visible, though every hour with perceptibly lessening brilliance. Tubby and Ameena sat together in the observatory, watching the receding stars, and wondering how, among all these Universes, Sir Isaac would ever set his course going back, in order to reach that particular one of the Solar Systems to which they belonged.

The temperature of the vehicle was now, curiously enough, very comfortably warm—so warm indeed, that Tubby wore his white clothes and Ameena that dainty costume in which he had first seen her on Venus. This paradox of temperature—for here in outer Space it should have been insufferably cold—Sir Isaac had explained to them the evening before. Their velocity was so great, he said, that even the minute, widely separated atoms of the ether, pounding against the vehicle's base, were heating it—just as it had been heated before when passing through the atmospheres of the several planets upon which they had landed.

Sir Isaac, alone in the instrument room, worked over his figures incessantly, feverishly, all that afternoon. It was nearly five o'clock when, with a cry of triumph, he dropped his pencil and staggered to his feet.

“I've solved it! Tubby, Ameena, my friends, at last the problem is completed. We shall save our Earth now—nothing can prevent us!”

With head reeling, he groped his way out into the dim hallway and up the stairs, looking for his companions. In the starlight of the observatory he found them—Tubby lying prone with his head in Ameena's lap, she stroking his hair gently, singing softly a tender love-song of Venus.

“I've solved it!” Sir Isaac cried. “We cannot fail

now to save the Earth! My calculation is completed at last, down to the smallest decimal.”

Tubby turned his head slightly; Ameena's song died away.

“Oh, is that you, perffessor? Come on in an' congratulate us. Ameena an' me just got engaged!”

### CHAPTER X

#### In Which the Voyagers Reach the Inner Surface and Speedily Depart Therefrom After a Most Amazing Experience

THE silent, lonely, little vehicle plunging through the darkness of Space, a world to itself, now rang with the gay laughter of its three inhabitants. Sir Isaac had successfully completed his complex calculation, using therein every intricate device known to higher mathematics, with a verified result correct to seventeen decimals. Tubby and Ameena were engaged to be married. What stupendous events to have occur simultaneously. No wonder the little Celestial wanderer was the scene of rejoicing.

It was an evening of the gayest festivity. Sir Isaac, proud and happy as a boy, kissed the radiant Ameena, fending off Tubby who tried to stop him. Then the girl went into the kitchen and prepared the evening meal. And such a dinner it was. For two hours they sat over it, laughing and discussing their plans.

“We must hasten now,” Sir Isaac said in a moment of comparative quiet. “Nothing remains but for me to show you the edge of Space, which I want very much to do. Then we must hurry back and put my plan for the downfall of Mars and his allies into operation. I fear nothing now. We cannot fail.”

“You can't get back too quick for us,” Tubby declared. “This here outer Space ain't no place to go lookin' for a minister in. Where we goin' to get married, Ameena? The Earth or Venus?”

The girl had not yet made her choice; and the question was left open.

The penny-ante poker game in the instrument room—a game at which Ameena had now become extremely proficient—lasted well into the night. When it was over Sir Isaac made a brief calculation and concluded that the “Edge of Space”—as, with a slight smile he still insisted on calling it—was still considerably below them. The vehicle therefore, needed no attention.

After this pleasant discovery, Ameena lingeringly parted from Tubby and retired to the upper floor. The two men made up their beds in the instrument room. Within fifteen minutes all three were fast asleep.

Evidently nothing unusual occurred during the night, for when the three voyagers awoke about ten o'clock next morning they found themselves still silently dropping into the abyss of blackness. Overhead the stars of that last Universe were still visible, though now extremely faint.

### Social Life Begins

DURING a lazy breakfast the three friends fell to talking personalities.

“You got a lot of names, ain't you perffessor?” Tubby said.

“Quite a good many,” responded Sir Isaac pleas-

antly. He was obviously pleased at the question. "I am usually known merely as Sir Isaac Swift De-Foe Wells-Verne—but I have other names—Stockton, for instance."

"What's the 'Isaac' for?" Tubby asked. "I ain't never seen that on your books."

Sir Isaac frowned. "Well, to tell you the truth, my friends, I am just a little ashamed of that. Even in my early infancy my marked scientific bent was apparent, and my grandfather insisted on my being named Isaac. He was a great admirer of Isaac Newton, you see. Of course Newton was, in a way, a brilliant man. I would have preferred Jules, or Herbert George however. I often use both those names. I think Herbert George is rather natty, don't you?"

Ameena agreed that it was.

Sir Isaac might have pursued this interesting topic indefinitely, but Tubby cut him short.

"Won't you please tell us about this here Edge of Space we're headed for?"

Sir Isaac, in view of their imminent arrival at the Edge of Space, evidently considered that the proper dramatic moment had come to tell them about it.

"I'm sorry you are not familiar with my scientific narrative about this subject," he began somewhat pompously. "However, that is immaterial. . . . In it I explained that every atom of the Universe is really a world in itself. Its interior is a void of ether, an infinitesimal core of Space, surrounded by a shell of matter. That is an atom. I do not mean the old-fashioned word atom, but the inner nucleus which the professional scientists of Earth have just managed to discover. Do you follow me?"

"Sure," declared Tubby. "An atom is like a cocoanut, only with ether where the milk ought to be."

Sir Isaac beamed; Ameena regarded Tubby with admiration.

### Sir Isaac's Theory Unfolds

"EXACTLY" agreed Sir Isaac. "There are electrons, of course, which Sir Ernest Rutherford most doggedly insists are particles of disembodied electricity—negative, you know—spontaneously liberated from the atoms. However, in this Golden Atom which I described, there revolved, in its central void of ether, an infinite number of minute worlds, stars, planets, comets; a complete little Universe of its own. Do you still follow me?"

His two auditors nodded somewhat dubiously.

"What's this got to do with the Edge of Space?" Tubby demanded.

"I'm coming to that. You must understand now, that just as all distances and all motions are relative one to the other, so also is size. I have brought to your imagination the golden atom containing a minute Universe in its central void of Space. That to our minds, is almost infinite smallness."

Sir Isaac hesitated impressively.

"Now, my friends, remember, size is only relative. Conceive now another atom, an almost infinitely large atom. Within this gigantic atom, revolving in its central void of ether, place a Celestial Universe—the Celestial Universe in which you and I live, the stars and planets among which we have been voyaging for many days past."

"Yes," said Tubby faintly. "An' then——"

"Then you will realize that we are soon to reach

the limits of this atomic void. We shall land upon the inner, concave surface of the atom which contains us!"

Sir Isaac's smile was triumphant.

"Is that not wholly logical that we shall land upon this inner surface shortly? But we will not stay there, or proceed further. We must return at once to our own tiny little planet. So much for facts. If you wish to imagine beyond that, I shall say that were we able enormously to increase our bodily size, we might pass through the shell of our Atom, which possibly is as thick through as it is across its central void of Space. Then we should emerge on the convex outer surface. By still further increasing our bodily dimensions, we would outgrow this Atom and find ourselves in another world, of which this larger, inconceivably large world, of which this Atom of ours may quite well be an atom of somebody's wedding ring, or the atom of a column in a King's castle, or the minute fragment of a grain of sand in a vast desert. You asked me about absolute motion. Suppose our atom *is* in a grain of sand of some vast desert and is now being blown in a storm—or that——"

"Never mind any more," Tubby cried. "We got the idea, ain't we Ameena?"

"It is very wonderful," the girl declared slowly. "But a little difficult to follow, just at first."

"You'll get used to it," said Sir Isaac. "Just keep on thinking about it a while. It's my own theory. I'm going to tell Sir Ernest about it because *my* atom is really that inner nucleus, that portion, around which his electrons revolve. So you see this theory of mine will help him out a lot. . . . Ameena, you do make very good coffee. Can I have another cup?"

When, after breakfast, they gazed down through the floor window, a very faint luminous glow seemed growing in the blackness far below them. Sir Isaac regarded it intently a moment, then with a cry of satisfaction hastened to the keyboard.

"That is light diffused throughout the atmosphere of the Inner Surface," he said, as he altered the positions of several of the keys.

"I am checking our velocity very rapidly now," he added as he straightened up. "We will arrive at our destination this evening."

His prediction was correct. All that afternoon the luminous glow beneath them grew in intensity. By supper time it gleamed like a pale phosphorescence, spreading out in all directions to the visual limits of the floor window. Shortly after supper they entered the atmosphere of the Inner Surface at an altitude which Sir Isaac calculated to be several hundred thousand miles.

It was nearly nine o'clock when Tubby, peering downward, saw what might have been the broad plateau of a mountain-top coming up out of the yellowish, luminous haze. It was a flat surface extending out of sight in three directions. But its fourth side, almost directly beneath them, ended in a sharp line with a dimly yellow abyss beside it.

"Look at the cliff," Tubby called to Sir Isaac. "You better slow up some more an' figure out where we're goin' to land."

They were then some ten thousand feet above the top of this "cliff," as Tubby called it. Sir Isaac, after a careful inspection of it which was difficult in the very dim, hazy yellow light, finally decided to de-

scend very slowly close beside its perpendicular face and thus reach the lower level of land adjacent.

They made the descent in the dim starlight in an increasing yellow glare from below a thousand feet away from the face of the precipice. The wall of rock extended in a direct line as far as they could see, as straight as though it were hewn by a rule.

#### At the Outer Surface

IT was a descent of some fifteen miles. Tiny points of light now showed beneath them. Through the side window of the instrument room, the dim face of the huge rocky wall slid swiftly upward, as though the vehicle were a silently dropping elevator car. Occasionally, rectangular openings in the rock wall went up past the window, openings five hundred feet long, from which a lurid glare of yellow-red light blazed with blinding force out into the night.

"Say," whispered Tubby, awe-struck. "What sort of a place is this?"

A brilliant ball of fire, seeming hardly more than a hundred feet away, came vertically up past the side window, a ball of blazing flames ten times the size of the vehicle itself. The heat from it was tremendous. From the lower window an even brighter though diffused light was streaming in; and a deafening, roaring noise filled the room.

It all happened within the space of a few seconds. Sir Isaac, who had been hovering anxiously between the windows and the keyboard, became suddenly confused. He started toward the table, then changed his mind and leaped to the side window, if falling over Ameena, who was in his path.

"Look!" shouted Tubby, above the roar. "Hey, look out, perfessor! Let's get up out of here!"

An enormous, swiftly moving black surface, completely obstructing the side window for an instant, went past close outside. Sir Isaac leaped back to the table just as the vehicle struck something soft and yielding—a glancing, sidewise blow. Tubby and Ameena were hurled to the floor. Sir Isaac, clinging desperately to the table, fumbled for the keyboard, and altered several of the keys. There was a gigantic swishing noise; the room trembled—tilted sidewise. Then silence.

Tubby raised his aching head. "Where's Ameena? Ameena! You ain't hurt?"

Her faint voice reassured him. He raised himself to a sitting position. "Oh, perfessor—you hurt? What happened? Where are we?"

They were none of them more than badly shaken up. The room was level again, vibrationless, soundless. Through the floor window shone the faint stars; out of the side window, high above, the yellow glare of the Inner Surface was fading. The vehicle had turned over, and was again dropping out into Space!

Tubby lifted Ameena to a chair and kissed her reassuringly. "'Sall right. We ain't hurt none. What happened, perfessor? What *was* all that?"

Sir Isaac did not know. For an hour they compared notes on what they had seen. It had all happened so quickly; it was so confusing, so unexpected. Their view through the little windows at near objects was so limited they found that each of them had seen things differently.

"Well, anyhow," Tubby declared with a shrug, "we landed on that there Inner Surface, an' we got

away again without gettin' smashed up. Now let's get home an' fix this Mars business. We only got twenty-six days left."

With the entire repellent force of the Inner Surface above it, and the attraction of several of the celestial universes at its base, the vehicle rapidly gained velocity. It was nearly midnight when Sir Isaac, coming out of a profound meditation, suddenly exclaimed.

"I know what happened to us on the Inner Surface! Fancy that! How could I have been so stupid?"

"What?" demanded Tubby.

Ameena, who just at that moment was preparing to retire to bed, stood poised with a bottle of liniment in her hand.

Sir Isaac said excitedly:

"The inhabitants of the Inner Surface, relative to us, must be gigantic in size. How silly of me not to have realized that!"

"Well?"

"Well," Sir Isaac continued, "that was a gigantic building alongside of which we went down—a building fifteen or twenty miles high! Those huge, yellow rectangles were its lighted windows! That ball of fire was a street light! We descended directly into a city street, and *collided, probably, with the coat-sleeve of a pedestrian!*"

#### CHAPTER XI

##### In Which the Mathematical Genius of Sir Isaac Plays Havoc with the Minor Planets, but Saves the Earth from Disaster

THE vehicle had passed within the orbit of Jupiter on its return voyage before Sir Isaac deemed it expedient to explain to his fellow voyagers his mathematical plan for the salvation of the Earth. It was the morning of the day before Mars was to be in opposition with the Earth. To be exact, just thirty-four hours remained at the moment the orbit of Jupiter was crossed.

The return trip—of a little less duration than the voyage out—had been devoid of any exciting events chiefly owing to the unflagging vigilance of Sir Isaac. His genius for astronomy—by some method which he did not see fit to explain to his friends—enabled him unerringly to find his way back to the proper Universe, and thence to the Solar System.

During these days and weeks, sleeping little, Sir Isaac had remained almost constantly at his post at the instrument room floor window, or at the table beside the keyboard, verifying over and over again, his gigantic calculations; or writing on his now very bulky manuscript. Tubby and Ameena, left thus to their own devices, passed the time pleasantly enough, singing their duets whenever Sir Isaac would let them, and always cooking the meals and washing the dishes together. The wedding had now been set to take place on the Earth, immediately upon their arrival, with a honeymoon trip to Venus.

At meal time which the three friends occupied principally with argument and with scientific dissertations from Sir Isaac, Tubby had once remarked:

"Them inhabitants of the Edge of Space must have been awful big, perfessor. Big as anybody could get. Ain't I right?"

Sir Isaac, in a manner that now was becoming quite habitual, smiled condescendingly.

"My dear fellow, those inhabitants of the Inner Surface of our Atom may be, possibly, several hundred times larger than ourselves. But, like us, they are merely denizens of an infinitesimal Atom. The inhabitants of that outer world are so much larger that their most powerful microscopes—assuming they have microscopes—would be necessary even to see our Atom itself much less see us or the planets in it!"

Within the orbit of Jupiter—they were heading for Mars and had passed a very considerable distance from Jupiter itself—Sir Isaac materially checked their velocity. The region of the Minor Planets lay ahead. It was among them that he planned to operate.

#### Sir Isaac Explains His Plan to Save the Earth

**A**FTER breakfast that morning he called Tubby and the girl into the instrument room and very quietly but solemnly announced that he was ready to explain his plan. Tubby and Ameena sat together in the huge easy chair, she perched on his lap, and hand in hand they prepared to give Sir Isaac their closest attention.

"My dear friends and fellow voyagers," Sir Isaac began, with something of the tone of a public lecturer, "we come now to the most important, most remarkable, and I may say the most awe-inspiring event of our scientific adventure around the Celestial Universe."

"I wish he did not have such long prefaces," Ameena whispered to Tubby.

"Sh! you'll make him mad," Tubby whispered back. "He don't mean nothin'. He gets that way from writin' so much."

"As you both know," Sir Isaac went on, ignoring these whispered asides, "at 6:15 P. M. tomorrow evening the Planet Mars will be at its closest point to the Earth. We anticipate then that the combined Martian and Mercurian armies will voyage to our Moon, which already they have conquered, there to prepare to attack the Earth. It is necessary, therefore, for us to prevent this migration. If we can keep the armies on Mars their small force now occupying our Moon will be powerless for offensive movement. We could even send armies from Earth to destroy them; or, at the next opposition doubtless they would return to Mars of their own volition."

"Right," Tubby agreed impatiently. "But please tell us how we're goin' to stop the Mars armies from movin' over to our Moon."

"I will," stated Sir Isaac. "But first you must understand the scientific laws governing what we are about to do. A poet once said, 'Thou canst not touch a flower without troubling of a star.' He did not mean it scientifically perhaps, but its scientific application is very pertinent. It means that if you so much as pick a flower anywhere in the Universe, you alter, by some minute fraction, the course of every star—every celestial body, no matter how distant, or how gigantic.

#### The Universe Delicately Balanced

**"**SEE you do not quite understand me. The Celestial Universe is very delicately balanced. Every force acting upon the celestial bodies has another force to counteract it. Now since every body attracts every other body directly as the mass

you will realize that a daisy growing in a field on Earth attracts Neptune or Mars just as much in proportion to its mass, as they attract the daisy. And since attraction is inversely as the square of the distance, it follows that if you pick the daisy, thus altering its position, you alter its attraction. And therefore—very minutely, of course—you disturb the movements of every body in the Universe."

"I think we understand you," Ameena said. Sir Isaac had paused, and this time Tubby had failed to make any comment. "It is really very interesting. Do go on, Sir Isaac."

Sir Isaac continued:

"Well, I propose to do just that very thing. To——"

"Pick a daisy?" Tubby put in. He glanced at Ameena for approval of this quip, but she frowned.

"To so alter the course of some very small celestial body—by using the attraction of our vehicle upon it—that a series of collisions, progressively greater in the masses of the colliding bodies, will rapidly occur among the Minor Planets."

"Oh," said Tubby, somewhat abashed. "Then what?"

"I have figured it out very carefully," declared Sir Isaac. "You may appreciate possibly the abstruseness and the delicacy of such a calculation. The collisions will climax at 5:34 P. M. tomorrow afternoon, by——"

The sentence was never finished. Past the side window, very close outside, a gleaming white object flashed! Sir Isaac, Tubby and the girl leaped to their feet in fright. A glance upward out of the side window was enough. It was that same Mercurian vehicle, hovering here between Mars and Jupiter, awaiting their return!

"Say—what the—did they try an' run into us?" Tubby gasped.

The glistening white cube was receding rapidly above them. Suddenly it turned, and as they hurried into the store-room to observe it from there, it came rushing toward them again.

#### Attacked by the Mercurians

**"**IT'S runnin' into us!" Tubby cried in terror. "Hey pefessor! Let's do somethin'—let's get a-goin' somewhere!"

Sir Isaac rushed back to the keyboard. The horrible meaning of the situation became clear. The Mercurian vehicle, manned by "suicide volunteers," was endeavoring to destroy them and itself simultaneously by a collision in Space!

Sir Isaac, his blood running cold in his veins, shook himself together, and with deliberate care depressed two of the keys. The Heavens turned over swiftly, dizzily.

Tubby, who was standing in the center of the room, clutched Ameena for their mutual support.

"Don't look at them windows!" he cautioned. "Close your eyes. Pefessor, which way we goin'? What'll I do to help? Where's them Mercurians? Are we duckin' 'em?"

Nothing could be distinguished through the windows save the rapidly shifting firmament. Sir Isaac gritted his teeth.

"That tiny asteroid!" he muttered. "We were near it, the first asteroid in my calculation."

A blinding white glare burst through the side

window; Sir Isaac, desperately pressing other keys, finally brought the Heavens to rest.

"It's—all right," he panted. "That burst of light—that—"

Through the side window a tiny blazing globe was receding above them; from none of the windows was the Mercurian vehicle to be seen.

### The Enemy Annihilated

"**WE** are safe," said Sir Isaac a moment later, when they had all calmed down a little. "The Mercurians collided with that little asteroid. They are annihilated."

Sir Isaac's face was as sober as though this were personally a great misfortune to himself—which indeed it was. He added:

"That asteroid was the first in my calculation—the one on which I was to begin operations. This unforeseen collision has changed its course—the whole fabric of my calculations has been altered." Tears welled into his eyes. "I—I tried so hard to have it mathematically perfect. And now it's ruined! Now we are powerless to save our world!"

The unfortunate man was overcome for a moment. Tubby and the white faced girl sat beside him.

"You can figure it out again," Tubby said consolingly. "Try, professor. Maybe it ain't ruined at all."

Under the influence of Ameena's gentle fingers stroking his hair, and her soft words of courage in his ear, Sir Isaac suddenly braced up.

"I'll do it!" he cried. "Give me my pencil and paper . . . Ameena, make me some strong, black coffee. Bring it here . . . with my lunch . . . Tubby, give me my cigarettes, and let me alone. Go away. I must rectify this terrible error."

He dashed the damp locks of hair from his eyes; and while Ameena hurried into the kitchen, he lighted a cigarette, pushed Tubby away, and plunged feverishly into his ruined computation. Ten minutes later he was altering the vehicle's course and, with his array of delicate scientific instruments, was making careful observations of the asteroids present direction and rate of flight.

Tubby kept out of the instrument room. At noon, Ameena took Sir Isaac's luncheon into him on a tray. He smiled up at her, momentarily suspending his flying pencil.

"I do hope your computation isn't ruined, dear Sir Isaac," she murmured gently.

"Oh, no," he said. "In fact I am beginning to think quite the contrary." He seemed wholly cheerful. "The Mercurian vehicle colliding with my asteroid altered its course, naturally. But I am beginning to discover that the alteration is favorable to my plans rather than the reverse."

He patted her shoulder. "Thank you, Ameena . . . That stew looks delicious . . . I shall have my new calculation completed in an hour, I hope. That Mercurian collision was a blessing in disguise."

So it proved, for by two o'clock in the afternoon Sir Isaac called his friends into the instrument room and triumphantly displayed his new set of figures.

"Very good indeed," approved Tubby. "Let's get to usin' 'em. What do we do first?"

"At 3:57 P. M. this afternoon we shall approach that same asteroid," Sir Isaac announced. "Just leave everything to me. It is all quite simple now!"

### Coaxing an Asteroid From Its Course

**A**T 3:57 P. M. exactly they were encircling the asteroid at a distance of some ten miles—speeding around it in a circular orbit as though they were its satellite. But with each revolution they paused on one side and drew away slightly, coaxing it from its path by their attraction.

It was a tiny celestial wanderer indeed—not more than three or four thousand feet in diameter Sir Isaac said—nothing but a boulder flying alone through Space.

At 4:17 P. M. the vehicle withdrew. Tubby was anxious to have something happen; but for nearly an hour nothing did. It was 4:45 P. M. when Sir Isaac pointed through the side window to another, somewhat larger asteroid approaching. With careful work at the keyboard he swooped the vehicle toward it—around it twice—and then slowly away again in the opposite direction.

"There," he murmured. "I think I have done my part correctly. The laws of Celestial Mechanics must do the rest."

He sat at the side window, watching. Tubby and Ameena saw the first asteroid far above them. The other was obviously nearing it. Both had been deflected from their normal course by Sir Isaac's skill; a collision was inevitable.

### The Asteroids Collide

**I**T came at 5:51 P. M.—as Sir Isaac had calculated—a soundless flash, and then a new, larger celestial body, the fused mass of the other two, wavering in Space, plunging diagonally toward the Sun, and at last finding its new orbit by that delicate balancing of forces which is the marvel of Celestial Mechanics.

Sir Isaac was jubilant. He took several observations of the new asteroid.

"Perfect, my dear friends. The new orbit is identical with my calculation. There will be another collision, with a much larger planetoid, at 7:19 P. M. Let us have dinner."

"Very good idea," approved Tubby with relish.

Tubby and Ameena still had only a vague idea of how all this was to save the Earth; but they trusted Sir Isaac implicitly. Besides, they did not dare ask any advance details, which would have offended Sir Isaac's sense of the dramatic.

The second collision—another, larger flash—took place exactly at the appointed time. And all during the evening and far into the night, other collisions occurred. Each involved larger bodies—and after each, from the vehicle which followed in their train, Sir Isaac computed the orbital elements of the new celestial body.

"You had better go to sleep," he said, at two o'clock. "There will not be another until 4:35 A. M. It involves a very considerably larger body—I shall wake you up in time to see it."

He added solemnly:

"I trust this next Minor Planet is not inhabited. I do not think so, though it is over two hundred miles in diameter. I did not want to involve it—but I had to."

At 6:03 P. M. the following evening, just twelve minutes before the long-anticipated opposition of Mars with the Earth, the climax came. There had been two gigantic collisions during the day. The last one—at 2:23 P. M.—involved two bodies of almost

equal mass which approached each other from diametrically opposite directions. A head-on crash ensued. A new body, fused into a molten mass by the created heat of arrested motion, hung for an instant suspended—completely devoid of orbital velocity. Then it moved downward—slowly at first, then swiftly, with constant acceleration plunging down toward the center of mass of the Solar System—the Sun.

The vehicle followed it cautiously. Watching this enormous, fiery derelict created by the mathematical genius of Sir Isaac, it was nearly six o'clock before Tubby and Ameena grasped the true significance of what was taking place before their very eyes.

The new asteroid—five hundred miles in diameter, a white-hot core with flames hundreds of miles in height leaping from it, plunged for the Sun. But Mars also lay beneath it though slightly off to one side—Mars, now a huge, reddish, smug-looking crescent across the lower firmament.

### Blazing Asteroid Plunges Toward Mars

MINUTES passed. The three watchers crouched tense at the lower window of the instrument room. The blazing asteroid plunged on. Its course for the Sun would take it half a million miles to the side of Mars! Five minutes more! The asteroid, feeling Mars' attraction as it approached, began turning gradually aside, deflected by this other attraction which at such proximity was greater than the Sun's.

Then at last Tubby understood! He gripped Ameena—breathless.

"Look! Mars is pullin' it! Look!"

It was 6:03 P. M. exactly when, with a gigantic, soundless flash, the molten asteroid collided squarely with the Planet's upper surface!

## CHAPTER XII

### In Which Tubby's Wonderful Gift, Revived on Earth, Brings About a Cataclysm, and His Astronomical Adventures Are Abruptly Terminated

WHAT a triumph, even for the genius of a super-mathematician! A blazing, molten mass of matter five hundred miles in diameter had fallen upon the surface of Mars at almost the very moment of its anticipated triumph over an inoffensive neighboring planet! No wonder Tubby and Ameena were overjoyed! No wonder Sir Isaac's pale, intellectual countenance could not but reflect the pride in his heart!

Tubby shook his friend's hand warmly; Ameena kissed him.

"Well," declared Tubby, "I guess that settles them Martians. Some excitement for them right now!"

"Did it kill many of them, do you think, Sir Isaac?" Ameena asked anxiously. "Women and little children—"

"I'm afraid it did," Sir Isaac said soberly. "I could not help that—the innocent must everywhere suffer for the guilty. I had to do the best I could for our own world."

He sat down, pondering. Then he added:

"I have no idea what such a collision would do or what may be the result of it to the orbit of Mars and thus to the other planets. The heat generated may have roasted every living creature on the globe. Or

perhaps not. But I rather imagine those armies will have enough to do at home without undertaking an invasion of the Earth for some time to come."

"I should guess yes," Tubby declared enthusiastically. He threw his arms around Ameena and kissed her vigorously. "Now all we got to do is hurry right home so you an' me can get married. Ain't I right, kid?"

The girl agreed that this was logical.

"I shall have you there tomorrow," said Sir Isaac. "We need not bother with the Moon—let us leave that little Martian army marooned there. We will let it alone—it cannot harm us."

"Sure," agreed Tubby. "Let it alone. Come on, let's eat and then play poker."

On this last leg of the journey, Sir Isaac insisted on going slowly. In the first place he was thoroughly exhausted and demanded twelve solid hours' sleep; and also, with Tubby and Ameena thus in continuous command, he felt it was advisable to make haste slowly. It was therefore not until 9:45 P. M. the following evening that the vehicle landed again upon the Earth from which it had departed some sixty days previously.

### The Last Evening Aboard

THE last evening in the vehicle was a solemn one. Tubby and Ameena were to part from their friend and take their honeymoon trip alone in it to Venus. A hazardous voyage, doubtless! But youth and inexperience are always confident.

"You're a very wonderful man, Sir Isaac," Ameena said during that last supper.

"You sure are," Tubby confirmed. He hesitated, scratching his head. "But say, professor, there's one or two things about this here voyage of ours I ain't quite got clear."

Sir Isaac nodded encouragingly.

"For one thing," Tubby began. "I ain't got this gravity part very straight. Why is it when we're in this vehicle we don't personally feel all these here changes of gravity? If the gravity is cut off from under us why don't we get lighter?"

It was a stupendous bit of logical reasoning on Tubby's part. It surprised Ameena; it amazed Sir Isaac.

"Why—why—" he stammered. Then he smiled frankly.

"I really cannot explain exactly," he confessed. "The thing surprised me very much. I've been worrying over it for my manuscript. It is a fact that we do not feel any changes of gravity until we actually land upon some celestial body. But why, I cannot say. I think it's because of our velocity, the constant acceleration or changes of velocity of the vehicle. Motion and gravity are very closely related. If it's that, Einstein would know all about it. He disagrees with me on almost everything, but still he's a nice sort of chap. I think I shall have to consult him."

"I would," said Tubby. "Then there's another thing. You got this here vehicle built wrong. You got the observatory on top an' we're always goin' the other way. You never onc't used that little telescope. An' then there's—"

"Tubby!" cautioned Ameena. And, in deference to the feelings of their friend, who after all was only human and therefore liable to err, Tubby took the hint and stopped.

(Continued on page 675)

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## AROUND THE UNIVERSE

By Ray Cummings

(Concluded)

### The Sky Travelers on Earth Again

THEY landed, after a careful reconnoiter, within a few hundred feet of where they had started. As they stepped from the vehicle to that earth upon which Ameena had never before set foot, Bill Hawkins' apple trees were in plain sight in the moonlight. Instantly Tubby remembered his wonderful gift which had brought Sir Isaac's Inter-planetary vehicle into material being. The thought of it had never crossed his mind since the first few minutes after their departure from Earth. How foolish all their perturbation over the Martian attack! Why all they need have done was come home, and Tubby could have wished that all the Martians and Mercurians would drop dead as fast as they landed!

Tubby explained all this excitedly to his friends. Sir Isaac frowned.

"I thought of that," he said. "But I could not be concerned in trickery like that. My public would not stand for it. We had a scientific problem to solve, and we solved it with science—quite reasonably and properly."

Tubby nodded acquiescence; but his eyes were sparkling as he regarded Bill Hawkins' apple orchard.

"All right, perfessor. But *I'm* goin' to get revenge on this guy Hawkins anyway. You do things your way—I do them my way. Come on over an' let's see them apples turn rotten."

Sir Isaac was greatly annoyed. "I beg of you not to. It is childish. To engage in such foolishness, after all our scientific adventures—"

"*You* did that onc't," Tubby suddenly accused. "An' when you wrote how you did it, you signed that there Wells name. *I* read it."

Sir Isaac flushed. "Yes, I did," he admitted, with some heat. "I did descend once to such an unplausible trick—and I've been sorry for it ever since. I've been trying to live it down. I—Tubby, you'll only bring disaster upon yourself—upon all of us. Forget that ability you have. Don't ever—"

"I ain't goin' to forget it," Tubby persisted

doggedly. "I wish all Bill Hawkins' apples was rottin' on the trees. I wish—"

A diabolical memory of that similar situation Sir Isaac had once conceived under his favorite "Herbert George" name came to Tubby.

### Tubby's Wishing Power Gets Him Into Trouble

"*I WISH* the earth was revolvin' twice as fast as usual, so Bill Hawkins' house would fly off in the air," he intoned.

Ameena flung her arms about his neck; Sir Isaac gave a cry of terror. A fearful gale of wind came roaring down upon them. Stones, sticks, every manner of flying missile, whistled by.

Sir Isaac, shouting something incoherent, flung himself prone upon the ground. Tubby gripped a tree-trunk to hold himself from blowing away; Ameena clutched him in terror.

In the midst of the hurricane Bill Hawkins' house was standing firm. Suddenly madness possessed Tubby.

"*I wish* the Earth was revolvin' ten times as fast! *I wish—*"

Sir Isaac's body left the ground, hurtling into the air like a bullet. Tubby swung one arm around Ameena, and one about the tree-trunk. He felt like a balloon tugging at its leash. The wind was a cyclone. A house went sailing through the air—Bill Hawkins' house.

"Tubby! Don't, Tubby!"

The girl's appealing cry frightened Tubby. A flying billet of wood struck him viciously on the shoulder. He tried desperately to think of something to stop this horrible cataclysm.

"*I wish—*" he murmured. "*I wish* I hadn't never been able to wish nothin'. *I wish* I'd forget all about havin' done this. *I wish—*"

The clink of the poker chips was incessant—annoying. Tubby stared across the smoke-laden room at the three men under the circle of light. He remembered dimly that they had been arguing, and sat up abruptly.

"As I was sayin', Jake," he announced. "I got a idea that this here Edge of Space—"

THE END