

**THRILLING**

AND

# **WONDER**

**STORIES**

25c  
AUG.

FEATURING: TWO SHORT NOVELS  
**ALARM REACTION**  
By **RAYMOND F. JONES**

**EARTHLIGHT**  
By **ARTHUR C. CLARKE**



A THRILLING  
PUBLICATION

EARLE  
BERGEY

# THRILLING WONDER STORIES

VOL. XXXVIII, NO. 3 A THRILLING PUBLICATION

AUGUST, 1951

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SAM MERWIN, JR., Editor

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# EARTHLIGHT

by ARTHUR C. CLARKE

## I

**I**F IT weren't for the fact," said Conrad Wheeler morosely, "that it might be considered disrespectful I'd say that the Old Man is completely nuts. And not just slightly touched like the rest of the people I've met on the Moon."

He looked balefully at Sid Jamieson, two years his senior on the staff of the Observatory. The latter grinned good-naturedly and refused to rise to the bait. "When you've known the Old Man as long as I have," he said, "you'll realize he doesn't do anything like this without a very good reason."

"It had better be good! My series of spectrograms was supposed to be finished tonight—and now look at the 'scope!"

The giant dome that housed the thousand-inch reflector was a shambles, or so a casual visitor would have thought. Even the natives were somewhat appalled by the confusion. A small army of technicians was gathered round the base of the great telescope, which was now pointing aimlessly at the zenith. Aimlessly because the dome of the Observatory was closed and sealed against the outer vacuum. It was strange to see men unprotected by space-suits walking over the tessellated floor, to hear voices ringing where normally

no slightest sound could be heard.

High up on a balcony on the far side of the dome the Director was giving orders into a microphone. His voice, enormously amplified, roared from the speakers that had been specially installed for the occasion. "*Mirror crew—stand clear!*"

There was a scurrying round the base of the telescope: then an expectant pause.

"*Lower away!*"

With infinite slowness the great disc of quartz, that had cost a hundred million to make, was lowered from its cell to the strange vehicle beneath the telescope. The ninety-foot-wide truck sank visibly on its scores of tiny ballon tires as it took up the weight of the immense mirror. Then the hoisting gear was released and with a purr of motors the truck and its precious cargo began to move slowly down the ramp leading to the resurfacing room.

It was a breathtaking sight. The men scattered over the floor were utterly dwarfed by the lattice-work of the telescope towering hundreds of feet above them. And the mirror itself, over eighty feet in diameter, seemed like a lake of fire as it reflected the glare of overhead lights. When at last it had left the room it was as though dusk had



*With the fate of the entire Solar System hanging in the balance, a laboratory scientist must decide upon fulfilling a crucial mission at the risk of his life*

## A NOVEL OF THE FUTURE





suddenly fallen.

"And now they've got to put it back!" grunted Wheeler. "I suppose that will take even longer."

"That's right," said his companion cheerfully. "*Much* longer. Why, last time we resurfaced the mirror—" The amplifiers drowned his voice.

"*Four hours twenty-six minutes*," remarked the Director in a fifty-watt aside. "*Not too bad. Okay—get her back and carry on.*"

THERE was a click as he switched off the microphone. In a strained and hostile silence the observatory staff watched his small rather plump figure leave the balcony. After a discreet interval someone said, "Damn!" in a very determined voice. The assistant chief computer did a wicked thing. She lit a cigarette and threw the ash on the sacred floor.

"Well!" exploded Wheeler. "He might have told us what it was all about! It's bad enough to stop the work of the whole observatory while we get the big mirror out when it's not due for resurfacing for months. But to tell us to put the blasted thing back as soon as we've dismounted it, without a word of explanation . . ." He left the sentence in mid-air and looked at his companion for support.

"Take it easy," said Jamieson with a grin. "The Old Man's not cracked and you know it. Therefore he's got a good reason for what he's doing. Also he's not the secretive sort—therefore he's keeping quiet because he has to. And there must be a *very* good reason for risking the near-mutiny he's got on his hands now. Orders from Earth, I'd say. One doesn't interrupt a research program like ours just for a whim. Hello, here comes Old Mole—what's he got to say?"

"Old Mole"—alias Dr. Robert Molton—came trotting towards them, carrying the inevitable pile of photographs. He was probably the only member of the observatory staff who even remotely re-

sembled the popular conception of an astronomer. All the rest, one could see at a glance, were businessmen, undergraduates of the athletic rather than the intellectual type, artists, prosperous bookmakers, journalists or rising young politicians. Anything but astronomers.

Dr. Molton was the exception that proved the rule. He looked out at the world and his beloved photographic plates through thick rimless lenses. His clothes were always just a little too tidy and never less than ten years out of date—though incongruously enough his ideas and interests were often not only modern but years ahead of the times.

He was very partial to boutonnières—but as the indigenous lunar vegetation gave him little scope in this direction he had to content himself with a somewhat restricted collection of artificial flowers imported from Earth.

These he varied with such ingenuity and resource that the rest of the staff had spent a good deal of fruitless effort trying to discover the laws governing their order of appearance. Indeed, a very famous mathematician had once lost a considerable sum of money because one day Old Mole appeared wearing a carnation rather than the rose advanced statistical theory had predicted.

"Hello, Doc," said Wheeler. "What's it all about? *You* ought to know!"

The old man paused and looked at the young astronomer doubtfully. He was never sure whether or not Wheeler was pulling his leg and usually assumed correctly that he was. Not that he minded, for he possessed a dry sense of humor and got on well with the numerous youngsters in the Observatory. Perhaps they reminded him of the time, a generation ago, when he too had been young and full of ambition.

"Why should I know? Professor Maclaurin doesn't usually confide his intentions to me."

"But surely you've got your theories?"

"I have but they won't be popular."

"Good old Doc! We knew you wouldn't let us down!"

The old astronomer turned to look at the telescope. Already the mirror was in position beneath its cell, ready to be hoisted back.

"Twenty years ago the last Director, van Haarden, got that mirror out in a hurry and rushed it to the vaults. He didn't have time for a rehearsal. Professor Maclaurin has."

"Surely you don't mean . . .?"

"In Ninety-five, as you should know

the moons of Jupiter and Saturn are the finest brains in the Solar System, fired with all the pride and the sense of power that the crossing of real space has given to man.

"They're not like us Earthbound planet-grubbers. Oh, I know we're on the Moon and all that but what's the Moon now but Earth's attic? Forty years ago it was the frontier and men risked their lives reaching it—but today the theater in Tycho City holds two thousand!

## *Man Is Here to Stay* .....

THE late Mr. William Olaf Stapledon, summing up his speculations on whether or not humanity would ever reach alien planets, decided in his justly famed lecture before the British Interplanetary Society some two years ago that people would have to adapt to new environments rather than the reverse.

He based his hopes for expansion throughout the Solar System on planned biological specialization rather than on human ability to adapt life on, say, Mars or Venus to human habitation by tailoring the planets to fit via machines. In other words Stapledon believed that we were going to have to breed special species of humans in simulated alien conditions if any of us were to survive at all on other planets.

Now, in this story, the secretary of that same learned British society, Mr. Arthur C. Clarke, takes an exactly opposite viewpoint. In his story humanity has successfully colonized not only the Moon, Venus and Mars but is established on the moons of Jupiter and Saturn and is preparing to move in upon the icy outer planets themselves. Furthermore, in Mr. Clarke's story, people have done this without ceasing to be people through controlled mutation. And the problem which they find themselves up against is a very human one indeed.

We wonder which of these men the future will prove right!

—THE EDITOR.

but probably don't, the Government was having its first squabble with the Venus Administration. Things were so bad that for a time we expected an attempt to seize the Moon. Not war, of course, but too close an approximation to be comfortable. Well, that mirror is the human race's most valuable single possession and van Haarden was taking no risks with it. Nor, I think, is Mac-laurin."

"But that's ridiculous! We've had peace for more than half a century. Surely you don't think that the Federation would be mad enough to start anything?"

"Who knows just what the Federation is up to? It's dealing with the most dangerous commodity in the universe—human idealism. Out there on Mars and

"The real frontier's out beyond Uranus and it won't be long before Pluto and Persephone are inside it—if they've not been reached already. Then the Federation will have to spend its energies elsewhere and it will think about reforming Earth. That's what the Government's afraid of."

"Well, and we never knew you were interested in politics! Sid, fetch the Doctor his soap-box."

"Don't take any notice of him, Doc," said Jamieson. "Let's have the rest of your ideas. After all, we're on quite good terms with the Federation. Their last scientific delegation left only a few months ago and a darn nice crowd they were too. I got an invitation to Mars I want to use as soon as the Director will let me go. You don't think they

would declare war, or anything crazy like that? What good would it do to smash up Earth?"

"The Federation's much too sensible to try anything of the sort. Remember, I said they were idealists. But they may feel that Earth hasn't been taking them seriously enough and that's the one thing that reformers can't tolerate. However, the main cause of trouble is this haggling over the uranium supply."

"I don't see what that's got to do with us," said Wheeler. "If there is a fight I hope they leave the Moon out of it."

**M**OLTON said thoughtfully, "Haven't you heard?"

"Heard what?" asked Wheeler, an uncomfortable sensation creeping up his spine.

"They say uranium has been found on the Moon at last."

"That story! It's been going around for years."

"I think there's something in it this time. I've had it from pretty reliable sources."

"So have I," put in Jamieson unexpectedly. "Isn't it something to do with Johnstone's theory of satellite formation?"

"Yes. You know Earth's the only planet with any appreciable uranium—it's connected in some way with its abnormally high density. Most of the uranium's a thousand miles down in the core where no one can get at it. But when the Moon split off it took some of the core with it—and the remnant's quite close to the surface here. The story's going round that it's been detected by lowering counters down drill-holes and they've found enough uranium to make all the deposits on Earth look like very small stuff."

"I see," said Wheeler slowly. "If that's true the Federation will be asking for increased supplies."

"And those nervous old women down on Earth will be afraid to let them have any," interjected Jamieson.

"Well, why should they?"

"Surely that's easy enough to answer. Earth's requirements are static—while the Federation's are increasing with each new planet that's colonized."

"And you think the Federation might try to grab any lunar deposits before Earth could get there?"

"Exactly—and if we are in the way we might get hurt. That would upset both sides very much but it wouldn't be much compensation to us."

"This is just what used to happen a hundred and fifty years ago back on Earth, when gold and diamonds were valuable. Claim-jumping, they used to call it. Funny thing, history."

"But supposing the Federation *did* seize a bit of the Moon—how could they hold it so far from their bases? Remember, there aren't any weapons left nowadays."

"With the legacy of the two World Wars it wouldn't take long to make some, would it? Most of the finest scientists in the Solar System belong to the Federation. Suppose they took a big space-ship and put guns or rocket torpedoes on it. They could grab the whole Moon and Earth couldn't push them off. Especially when they'd got hold of the uranium and cut off Earth's supplies."

"You should be writing science fiction, Doc! Battleships of Space and all that sort of thing! Don't forget to bring in the death-rays!"

"It's all right for you to laugh but you know perfectly well that with atomic power it *is* possible to put enough energy into a beam to do real damage. No one's tried it yet as far as we know—because there wasn't much point. But if they ever want to . . ."

"He's right, Con. How do we know what's been going on in the Government labs for the last generation? I hadn't thought about it before but it rather frightens me. You *do* think of the nicest things, Doc."

"Well, you asked for my theories and you've got 'em. But I can't stand here all day talking. *Some* people in this establishment have work to do." The

old astronomer picked up his plates and wandered off toward his office, leaving the two friends in a somewhat disturbed frame of mind.

Jamieson gazed glumly at the telescope while Wheeler looked thoughtfully at the lunar landscape outside the dome. He ran his fingers idly along the transparent plastic of the great curving wall. It always gave him a thrill to think of the pressures that wall was withstanding—and the uncomfortable things that would happen if it ever gave way.

The view from the Observatory was famous throughout the entire Solar System. The plateau on which it had been built was one of the highest points in the great lunar mountain range which the early astronomers had called the Alps. To the south the vast plain so inappropriately named the *Mare Imbrium*—Sea of Rains—stretched as far as the eye could reach.

To the southeast the solitary peak of the volcanic mountain Pico jutted above the horizon. East and west ran the Alps, merging on the eastern side of the Observatory into the walled plain of Plato. It was nearly midnight and the whole vast panorama was lit by the brilliant silver light of the full Earth.

**W**HEELER was just turning away when the flash of rockets far out across the Sea of Rains attracted his notice. Officially no ship was supposed to fly over the northern hemisphere, for the brilliant glare of a rocket exhaust could ruin in a second an exposure that might have taken hours, even days, to make. But the ban was not always obeyed, much to the annoyance of the observatory directorate.

"Wonder who that blighter is?" growled Wheeler. "I sometimes wish we *did* have some guns on the Moon. Then we could shoot down trippers who try to wreck our program."

"I call that a really charitable thought. Maybe Tech Stores can fix you up—they keep everything."

"Except what you happen to want. I've been trying to get a Hilger magnitude tabulator for the last month. 'Sorry, Mr. Wheeler, might be on the next consignment.' I'd see the Director about it if I weren't in his bad books."

Jamieson laughed. "Well, if you must compose somewhat — er — personal limericks better not type them out next time. Stick to the old oral tradition like the ancient troubadours—it's much safer. Hello, what's he up to?"

The last remark was prompted by the maneuvers of the distant ship. It was losing height steadily, its main drive cut off, only the vertical jets cushioning its fall.

"He's going to land! Must be in trouble!"

"No—he's quite safe. Oh, *very* pretty! That pilot knows his stuff!"

Slowly the ship fell out of sight below the rim of the mountains, still keeping on a level keel.

"He's down safely. If he's not there'll be a record fireworks display in just about ten seconds and we'll feel the shock over here."

With a mingling of anxiety and morbid expectation the two men waited for a minute, eyes fixed on the horizon. Then they relaxed. There had been no distant explosion, no trembling of the ground underfoot.

"All the same, he may be in trouble. We'd better ask Signals to give him a call."

"Okay—let's go."

The observatory transmitter, when they reached it, was already in action. Someone else had reported a ship down beyond Pico and the operator was calling it on the general lunar frequency. "Hello, ship landing near Pico—this is Astron calling. Are you receiving me? Over."

The reply came after a considerable interval, during which the call was repeated several times. "Hello, Astron, receiving you clearly. Pass your message please. Over."

"Do you need any assistance? Over."

"No thank you. None at all. Out."

"Okay. Astron out."

The operator switched off his carrier and turned to the others with a gesture of annoyance. "That's a nice polite answer for you! Translated into English it means 'Mind your own business. I won't give you my call sign. Good-day.'"

"Who do you think he is?"

"No doubt about it. Government ship."

Jamieson and Wheeler looked at each other with a simultaneous surmise. "Maybe the doc was right, after all."

Wheeler nodded in assent. "Mark my words, pardner," he said, "there's uranium in them thar hills. And I wish there weren't!"

## II

**D**URING the next two weeks ship after ship dropped down beyond Pico and, after an initial outburst of speculation, the astronomers ceased to comment on the sight. Quite obviously something important was going on out in the Sea and the theory of the uranium mine was generally accepted because nobody could think of a better.

Presently the Observatory staff began to take their energetic neighbors for granted and forgot about them except when rocket glare fogged important photographic plates. Then they went storming in to see the Director, who calmed them down as best he could and promised to make the appropriate representations in the proper quarters.

With the coming of the long lunar day Jamieson and Wheeler settled down to the tedious work of analyzing the data they had collected during the night. It would be fourteen days before they saw the stars again and could make any further observations. There was plenty to do, for an astronomer spends only a very small portion of his time actually working with his instruments. The most important part of his

life is spent sitting at a desk piled with sheets of paper, which rapidly become covered with mathematical calculations or doodles, according to the flow of inspiration.

Though both Wheeler and Jamieson were young and keen, an unbroken week of this was quite enough for them. In the slow cycle of lunar time it was generally realized that tempers began to get frayed around midday and from then until just before nightfall there was usually something of an exodus from the Observatory.

It was Wheeler who suggested they take one of the observatory tractors and head toward Pico on a voyage of exploration. Jamieson thought it was an excellent scheme though the idea was not as novel to him as to his friend. Trips out into the Sea of Rains were a popular diversion among the astronomers when they felt they had to get away from their colleagues.

There was always the chance of finding something interesting in the way of minerals or vegetation but the main attraction was the superb scenery. Also there was a certain amount of adventure and even danger about the enterprise that gave it an additional charm. Not a few tractors had been lost and although rigorous safety precautions were enforced there was always a chance that something might go wrong.

The almost complete absence of any atmosphere on the Moon had made economical flying impossible since rockets could not be used for journeys of only a few score miles. So practically all short-range lunar travel was done in the powerful electric tractors universally known as *Caterpillars* or, more briefly, "cats."

They were really small space-ships mounted on broad tracks that enabled them to go anywhere within reason, even over the appallingly jagged surface of the Moon. On fairly smooth terrain they could do up to eighty miles an hour but normally they were lucky to manage half that speed. The low grav-

ity enabled them to climb fantastic slopes and they could if necessary haul themselves out of vertical pits by means of their built-in winches. One could live in the larger models for months at a time in reasonable comfort.

Jamieson was a more-than-expert driver and knew the road down the mountains perfectly. As lunar highways went it was one of the best and carried a good deal of traffic between the Observatory and the port of Aristillus. Nevertheless for the first hour Wheeler felt that his hair would never lie down again.

It usually took newcomers to the Moon a long time to realize that slopes of one-in-one were perfectly safe if treated with respect. Perhaps it was just as well that Wheeler was a novice for Jamieson's technique was so unorthodox that it would have filled a more experienced passenger with real alarm.

Why Jamieson was such a desperate driver was a paradox that had caused much discussion among his colleagues. Normally he was painstaking and careful, even languid in his movements. No one had ever seen him really annoyed or excited. Many people thought him lazy but that was a libel. He would spend weeks working out a theory until it was absolutely watertight—and then would put it away for two or three months to have another look at it later.

**Y**ET once at the controls of a cat this quiet and peaceloving astronomer became a daredevil driver who held the unofficial record for almost every tractor drive in the northern hemisphere. More than likely the explanation lay in a boyhood desire to be a space-ship pilot, a dream that had been foiled by physical disability.

They shot down the last foothills of the Alps and out into the Sea of Rains like a miniature avalanche. Now that they were on lower ground Wheeler began to breathe again, thankful to have left the vertiginous slopes behind.

He was not so pleased when with a colossal crash Jamieson drove the tractor off the road and out into the barren plain.

"Hey, where are you going?" he cried.

Jamieson laughed at his consternation. "This is where the rough stuff begins. The road goes southwest to Aristillus here and we want to get to Pico. So from now on we're in country where only half a dozen tractors have ever been before. To cheer you up I might say Ferdinand is one of them."

"Ferdinand" was now plunging ahead at twenty miles an hour with a swaying motion Wheeler found rather disconcerting. If he had lived in an age that had known of ships he might have been familiar with it.

The view was disappointing, as it always is at "sea" level on the Moon, owing to the nearness of the horizon. Pico and all the more distant mountains had sunk below the skyline and the plain ahead looked uninviting as it lay in the blazing sun. For three hours they forged steadily across it, passing tiny craterlets and yawning crevasses that seemed of indefinite depth.

Once Jamieson stopped the tractor and the two men went out in their space-suits to have a look at a particularly fine specimen. It was about a mile wide and the Sun, now nearly at the zenith, was shining straight into it. The bottom was quite flat as though, when the rock had split, lava had flowed in from the depths beneath and solidified. Wheeler found it very difficult to judge just how far away the floor was.

Jamieson's voice came over the suit radio. "See those rocks down there?"

The other strained his eyes and could barely make out a few markings on the apparently smooth surface far below.

"Yes, I think I see the ones you mean. What about them?"

"How big would you say they are?"

"Oh, I don't know—maybe a yard across."

"Hm. See the smaller one near the side?"



"Yes."

"Well, that isn't a rock. That was a tractor that missed the bend."

"Good Lord! How? It's plain enough."

"Yes, but this is midday. Toward evening, when the Sun's low, it's the easiest thing in the world to mistake a shadow for a crevasse—and the other way round."

Wheeler was very quiet as they walked back to their machine. Perhaps, after all, they had been safer in the mountains.

At length the great rock mass of Pico came once more into sight until presently it dominated the landscape. One of the most famous landmarks on the Moon it rose sheer out of the Sea of Rains, from which, ages ago, volcanic action had extruded it. On Earth it would have been completely unclimbable. Even under one-sixth of Earth's gravity only two men had ever reached its summit. One of them was still there.

Moving slowly over the jagged terrain the tractor skirted the flanks of the mountain. Jamieson was searching for a place where the cliffs could be scaled so they could get a good view out over the Sea. After traveling several miles he found a spot that met with his approval.

"Climb those cliffs? Not on your life!" expostulated Wheeler when Jamieson explained his plan of action. "Why, they're practically vertical and half a mile high!"

"Don't exaggerate," retorted the other. "They're quite ten degrees from the vertical. And it's so easy to climb here, even in a suit. We'll be tied together and if one of us falls the other can still pull him up with one hand. You don't know what it's like until you've tried."

"That's true of all forms of suicide. Oh, all right—I'm game if you are."

Reluctantly Wheeler climbed into his space-suit and followed his friend through the airlock. Jamieson was carrying a small telescope, a long nylon rope and other climbing equipment,

which he draped around Wheeler on the pretext that, as he would have to go ahead, his hands had better be free.

Seen from close quarters the cliffs were even more forbidding. They seemed not merely vertical but overhanging and Wheeler wondered how his friend intended to tackle them. Secretly he hoped the whole campaign would be called off.

**I**T WAS not to be. After a brief survey of the rock face Jamieson tied one end of the rope around his waist and, with a short run, leaped toward a projection thirty feet up the face of the cliff. He caught it with one hand, transferred his grip to the other and hung for a while, admiring the view. Since he weighed only forty pounds with all his equipment this was not as impressive a performance as it would have been on Earth. However, it served its purpose of reassuring Wheeler.

After a while Jamieson grew tired of hanging by one arm and brought the other into action. With incredible speed he clambered up the face of the cliff until he was fully a hundred feet above the ground. Here he found a ledge that was to his liking as it was every bit of twelve inches wide and enabled him to lean back against the rock face.

He switched on his headset and called down. "Hello, Con! Ready to come up?"

"Yes. What do you want me to do?"

"Is the rope tied around you?"

"Just a minute. Okay."

"Right! Up we go!"

Jamieson started to haul in the rope and grinned at the other's sudden exclamation of surprise as he found himself hoisted unceremoniously into the air. When he had been lifted twenty or thirty feet Wheeler recovered his poise and began to climb the rope himself, so that as a result of their joint efforts it was only a few seconds before he had reached the ledge.

"Easy enough, isn't it?"

"So far—but it still looks a long way."

"Then just keep on climbing and don't bother to look. Hold on here until I call you again. Don't move until I'm ready—you're my anchor in case I fall."

After half an hour Wheeler was amazed to find how far they had risen. The tractor was no more than a toy at the foot of the cliffs and the horizon was many miles away. Jamieson decided they were high enough and began to survey the plain with his telescope. It was not long before he found the object of their search.

About ten miles away the largest space-ship either of them had ever seen lay with the sunshine glinting on its sides. Close to it was an enormous hemispherical structure rising out of the level plain. Through the telescope men and machines could be seen moving around its base. From time to time clouds of dust shot into the sky and fell back to the ground again as if blasting were in progress.

"Well, there's your mine," said Wheeler after a long scrutiny.

"It doesn't look much like a mine to me," replied the other. "I've never seen a lunar mine covered over like that. It almost looks as if a rival observatory is starting up. Maybe we're going to be driven out of business."

"We can reach it in half an hour, whatever it is. Shall we go over to have a look?"

"I don't think it would be a very wise thing to do. They might insist on our staying."

"Hang it all, there isn't a war on yet and they'd have no right to detain us. The Director knows where we are and would raise hell if we didn't come back."

"Not in your case, my lad. However, I guess you're right. They can only shoot us. Let's go."

Climbing down the cliff, unlike a similar operation on Earth, was easier than going up it. Each took turns lowering the other to the full length of the rope, then scrambling down the cliff face himself, knowing that even if he slipped

the other could easily check his fall. In a remarkably short time they had reached level ground again and the faithful Ferdinand set out once more across the plain.

**A**N HOUR later, having been delayed by a slight mistake in bearings for which each blamed the other, they found the dome ahead of them and bore down upon it at full speed, after first calling the Observatory on their private wave length and explaining exactly what they intended to do. They rang off before anyone could tell them not to.

It was amusing to watch the commotion their arrival caused. Jamieson thought it resembled nothing so much as an ant heap that had been well stirred with a stick. In a very short time they found themselves surrounded by tractors, hauling machines and excited men in space-suits. They were forced by the sheer congestion to bring Ferdinand to a halt.

"I suppose we had better wait for the reception committee," said Wheeler. "Ah, here it comes!"

A small man who managed to convey an air of importance even in a space-suit was forcing his way through the crowd. Presently there came a peremptory series of knocks on the outer door of the airlock. Jamieson pressed the button that opened the seal and a moment later the "reception committee" was removing his helmet in the cabin.

He was an elderly sharp-featured man and he did not seem in a particularly good temper. "What are you doing here?" he snapped as soon as he had escaped from the confines of his suit.

Jamieson affected surprise at such an unreasonable attitude. "We saw you were newcomers around here, so we came over to see how you were getting on."

"Who are you?"

"We're from the Observatory. This is Mr. Wheeler—I'm Dr. Jamieson. Both astrophysicists."

"Oh!" There was a sudden change in the atmosphere. The reception committee became quite friendly. "Well, you'd better both come along to the office while we check your credentials."

"I beg your pardon? Since when has this part of the Moon been restricted territory?"

"Sorry, but that's the way it is. Come along, please."

The two astronomers climbed into their suits and followed the other through the lock. Wheeler was beginning to feel a trifle worried and rather wished he had not suggested making this visit. Already he was visualizing all sorts of unpleasant possibilities. Recollections of what he had read about spies, solitary confinement and brick walls at dawn rose up to cheer him.

One of his most valuable assets as a theoretical scientist was his powerful imagination but there were times when he felt that he could do without it. Quite a large portion of his life was spent worrying about things which might happen as a result of the scrapes into which he was continually getting. This looked as if it might be one of them.

Outside the crowd was still gathered around their tractor but it rapidly dispersed as their guide gave instructions over his radio which Jamieson and Wheeler, tuned to the Observatory wave length, were unable to hear.

They were led to a smoothly-fitting door in the wall of the great dome and found themselves inside the space formed by the outer wall and an inner, concentric hemisphere. The two shells, as far as could be seen, were spaced apart by an intricate webbing of transparent plastic. Even the floor underfoot was made of the same substance. Looking at it closely, Wheeler came to the conclusion that it was some kind of electrical insulator.

Their guide hurried them along at almost a trot, as if he did not wish them to see more than necessary. They entered the inner dome through a small

airlock, where they removed their suits. Wheeler wondered glumly when they would be allowed to retrieve them.

### III

THERE was a smell in the air that they did not at once recognize, in spite of its familiarity. Jamieson was the first to identify it. "Ozone!" he whispered to his companion, who nodded in agreement. He was going to add a remark about high voltage equipment when their guide looked back suspiciously and he desisted.

The airlock opened into a small corridor flanked by doors bearing painted numbers and such labels as *Private, Keep Out! Technical Staff Only, Dr. Jones, Typists and Director*. At the last they came to a halt.

After a short pause a *Come In* panel glowed and the door swung automatically open. Ahead lay a perfectly ordinary office dominated by a determined-looking young man behind a very large desk. "Hello—who are these people?" he asked as his visitors entered.

"Two astronomers from the Observatory. They just dropped in by tractor. I thought we had better check up on them."

"Most certainly. Your names, please?"

There followed a tedious quarter of an hour while the Director took down particulars and finally called the Observatory. Jamieson and Wheeler breathed a sigh of relief when it was all over and everyone was satisfied that they were in fact themselves.

The young man at the imposing desk switched off the radio and regarded the two interlopers with some perplexity. Presently his brow cleared and he began to address them.

"You realize, of course, that you are a bit of a nuisance. This is about the last place we ever expected visitors, otherwise we should have put up notices telling them to clear off. Needless to say we have means of detecting them

when they do arrive—even when they don't drive up openly as you were sensible enough to do.

"Anyway, here you are and no harm done. You have probably guessed that this is a Government project, one that we don't want talked about. Now you are here I suppose I had better explain to you what it is—but I want your word of honor not to repeat what I tell you."

The two astronomers, feeling rather sheepish, assented.

"As you know radio communication to the outer planets is carried out in stages and not by direct point-to-point transmission. If we want to send a message to Titan it has to go, for example, Earth-Mars-Callisto-Titan, with repeater stations and all their masses of equipment at each leg of the journey. We want to do away with all that. This is going to be Communications Center for the entire Solar System and from here we can call any planet direct."

"Even Persephone when they get there?"

"Yes."

"One in the eye for the Federation, won't it be? They own all the relay stations outside Earth."

The Director looked at Wheeler sharply. "Well, I don't suppose they'll like it at first," he admitted. "But in the long run it will reduce costs and give everyone a much better service."

"The secrecy, I suppose, is to prevent the Federation thinking of the idea first?"

The Director looked a little embarrassed and refused to answer directly. He rose, made a gesture of dismissal. "Well, that's all, gentlemen. I hope you have a pleasant trip back to the Alps. And please ask your friends to keep away."

"Thanks for being so frank with us," said Jamieson as they turned to go. "We'll keep it to ourselves. But we're glad to know the truth, as there are so many rumors flying round nowadays."

"Such as?"

"To be perfectly honest we thought

this might be the mythical uranium mine there's been so much talk about."

The Director laughed easily. "Doesn't look much like a mine, does it?"

"It certainly doesn't. Well, good-bye."

"Good-bye."

The Director remained standing in moody silence for a while after Jamieson and Wheeler had left the room. Then he pressed the buzzer for his secretary. "You've recorded that?"

"Yes."

"They're nice chaps. I feel rather ashamed of myself. But if we just sent them away they'd start discussing us with their colleagues—and they might hit on the truth. Now that they think they know it their curiosity will be satisfied and they won't talk, especially since I've asked them not to and they're the sort who'll respect a promise. A dirty trick but I think it will work."

The secretary looked at his chief with a new respect. "You know, Chief, there are times when you remind me of that old Roman politician—you know the chap I mean."

"Machiavelli, I suppose—though he was a bit later than the Romans. By the way, did the screens detect them all right when they came in?"

"Yes—the alarms went off in plenty of time."

"Good! Then there's no need to increase our precautions. The only other step we could take is to publicly announce that this part of the Moon is taboo—and the last thing we want to do is to attract attention."

"What about the people at the Observatory? There may be more visitors."

"We'll call up Maclaurin again and ask him to discourage these private expeditions. He's a touchy old bird but I think he'll play. Now let's get on with that progress report."

JAMIESON and Wheeler did not return directly to the Observatory, for they were not expected back for a couple of days and there was still a lot

of the Moon to explore. Their visit to the dome, they felt, had been something of an anticlimax. It was true that they were sharing a secret and that was always exciting but they could not pretend it was a very spectacular secret.

"Well, where do we go from here?" asked Wheeler when the dome had dropped out of sight below the horizon.

Jamieson produced a large-scale photographic map of the *Mare Imbrium* and pinned it down with his forefinger.

"This is where we are now," he said. "I'm going on a circular tour that will really show you some lunar scenery. The *Sinus Iridum's* just two hundred miles east over quite good terrain and I'm heading for that. When we get there we'll go north until we reach the edge of the plain, and then follow the mountains back to the Observatory. We'll be home tomorrow or the next day."

For nearly four hours uneventful landscape flowed past the windows as Jamieson drove the tractor across the Sea. From time to time they passed low ridges and small craters only a few hundred feet high but for the greater part of their journey the terrain was almost flat.

After a while Wheeler ceased to take much notice of it and tried to do some reading but the jolting of the machine made it very uncomfortable and he soon gave up the attempt. In any case the only book in the tractor was Maclaurin's *Studies in the Dynamics of Multiple Star Systems* and this was supposed to be a holiday after all.

"Sid," began Wheeler abruptly. "What do you think about the Federation? You've met a lot of their people."

"Yes and liked them. Pity you weren't here when the last crowd left. We had about a dozen of them at the Observatory, studying the telescope mounting. They're thinking of building a fifteen-hundred-inch reflector on one of the moons of Saturn, you know."

"That would be some job—I always

said we were too close to the Sun here. But to get back to the argument—did they strike you as likely to start a quarrel with Earth?"

"It's difficult to say. They were very open and friendly with us but then we were all scientists together and that helps a lot. It might have been different if we'd been politicians or civil servants."

"Dammit, we *are* civil servants! Who pays our salaries?"

"Yes but you know what I mean. I could tell that they didn't care a lot for Earth though they were too polite to say so. There's no doubt that they're annoyed about the uranium allocation—I often heard them complain about it. Their main point was that they *had* to have atomic power to open up the cold outer planets and that Earth could manage quite easily with alternative sources of energy. After all, she's done so for a good many thousand years."

"Which side do you think is right?"

"I don't know. But I will say this—if more uranium does turn up and Earth doesn't let the Federation have a bigger share of it, then we shall be in the wrong."

"I don't think that's likely to happen."

"Don't be so sure. As old Mole said, there are a lot of people on Earth who are afraid of the Federation and don't want to give it any more power. The Federation knows that and it may grab first and argue afterwards."

"Hm. Then it's nice to know that our friends out by Pico aren't mining the stuff, after all," said Wheeler thoughtfully. "*Ouch*—was that necessary?"

"Sorry. But if you will keep me talking you can't expect me to avoid all the cracks. Looks as though the suspension wants adjusting. I'll have to turn Ferdy in for an overhaul when we get back. Ah, that's Mount Helicon coming up over there. No talking while I concentrate on the driving for the next few miles—the next section's a bit tricky."

The tractor turned northward and

slowly the great wall of the beautiful *Sinus Iridum*—the Bay of Rainbows—rose over the horizon until it stretched east and west as far as the eye could see. So overwhelming was the sight that Wheeler was voluntarily silent and sat for the next twenty miles without a word while Jamieson drove the machine toward the three-mile-high cliffs ahead.

He remembered his first glimpse of the *Sinus Iridum* through a two-inch telescope on Earth many years ago—it seemed scarcely possible that now he was actually skirting its towering walls. What unbelievable changes the twentieth century had brought! It needed a considerable effort to realize that at its beginning man had not even possessed flying machines, still less dreamed of crossing space.

The history of two thousand years seemed to have been crowded into the single century with its vast technical achievements and two tremendous wars. In its first half the air had been conquered more thoroughly than had the sea in all the millennia before.

In its closing quarter the first crude rockets had reached the Moon and the age-long isolation of the human race had ended. Within a single generation there were children to whom the word "home" no longer conveyed the green fields and blue skies of Earth, so swift had been the colonization of the inner planets.

**H**ISTORY, it has been said, never repeats itself but historical situations recur. Inevitably the new worlds began to loosen their ties with Earth. Their populations were still very small compared with those of the mother world but they contained the most brilliant and active minds the race possessed. Free at last from the crushing burden of tradition they planned to build civilizations which would avoid the mistakes of the past. The aim was a noble one—it might yet succeed.

Venus had been the first world to

declare its independence and set up a separate government. For a little while there had been considerable tension but good sense had prevailed and since the beginning of the twenty-first century only minor disagreements had disturbed relations between the two governments. Ten years later Mars and the four inhabited moons of Jupiter—Io, Europa, Ganymede and Callisto—had formed the union which was later to become the Federation of the Outer Planets.

Wheeler had never been to any of these outer worlds. Indeed this was the first time he had even left his native Earth. Like most terrestrials he was a little scared of the Federation though the scientist in him made him admire many of its achievements. He did not believe in the possibility of war but if there were "incidents"—as earlier statesmen would have put it—his loyalties lay with Earth.

The tractor rolled to a halt and Jamieson got up from the controls, stretching himself mightily. "Well, that's enough for today. Let's have some food before I turn cannibal."

One corner of the tractor was fitted up as a tiny galley but the two explorers were much too lazy to use it and had been living entirely on meals already prepared in the Observatory, which could be heated at the turn of a switch. They did not believe in unnecessary hardships. If a psychologist had examined the machine's stores he would have been convinced that its passengers suffered from an almost pathological fear of starvation.

Since it was always daylight they slept, ate, argued and drove whenever the spirit moved them. For nearly thirty hours they worked their way slowly along the foot of the Bay's mighty cliffs, pausing now and then to don space-suits and carry out explorations on foot. They found little but minerals, although Wheeler was greatly excited by the discovery of a peculiar red moss his friend had never seen before.



So little of the Moon had been explored in detail that it was quite possibly new to science and Wheeler pictured himself receiving all kinds of honors from the botanical world. These hopes were rudely shattered by the staff biologist a couple of days later but they were enjoyable while they lasted.

The Sun was still high when they were once again on the Alpine slopes though noon was long past and the thin rind of the crescent Earth was visible in the sky. Wheeler had enjoyed the trip but was getting tired of the cramped quarters. Also he was becoming more and more aware of accumulated aches and pains caused by the bumping of the vehicle over the worst ground any machine could possibly travel.

It was pleasant to get back to the bustle of life in the common-room, even though the same ancient magazines were displayed and the same people were monopolizing the best chairs. Very little had happened, it seemed, during their short absence.

The main topic of conversation was the complete breaking off of diplomatic relations between the Director's young and extremely pretty private secretary and the chief engineer, generally supposed to be her most favored suitor. This quite outshadowed more important items such as the recent discovery, by an incredible feat of mathematics, that van Haarden's planet possessed a system of rings like that of Saturn.

And not until they had heard the first news broadcast from Earth did Wheeler and Jamieson learn that the Federation's latest request for reconsideration of the uranium agreement had been received and rejected. "That will make old Mole excited," commented Wheeler.

"Yes—who would have thought the old boy took such an interest in politics. Let's have a word with him."

The old astronomer was in the far corner of the room, talking volubly with one of the junior physicists. He broke off when he saw the newcomers. "So

you're back. I thought you would break your necks out in the *Mars*. Seen any mooncalves?"

The references to H. G. Wells' fabulous beasts was a lunar joke of such long standing that many terrestrials took it quite seriously and thought the creatures actually existed.

"No, or we would have brought one back for the menu. How are things going?"

"Nothing out of the ordinary as far as I'm concerned. But Reynolds here thinks he has found something."

"Think—I *know*! Two hours ago all my recorders went haywire and I'm still trying to find what has happened."

"Which recorders?"

"The magnetic field strength meters. Usually the field is pretty constant except when there is a magnetic storm and we always know when to expect those. But today all the indicators have gone clean off the graph paper and I've been running around the Observatory to find if anyone has switched on something outside in the way of electromagnets. I've eliminated everything, so it must be external. It's still on and Jones is trying to get a bearing on it while I come up for a breather."

"Sure it's not a storm? You could find out from Earth—it would have hit them too."

"I checked on that—in any case there has been no unusual solar activity so that's ruled out. Also it's far too intense and it *must* be man-made for it keeps going on and off abruptly. Just as if someone's working a switch."

"Sounds very mysterious. Ah, here's Jones. By the look of him I'd say the Welsh Wonder has found something."

ANOTHER physicist had just hurried into the room, trailing several yards of recording tape behind him. "Got it!" he cried triumphantly. "Look!" He spread the tapes out over the nearest table, collecting some dirty looks from a party of bridge players who were heading toward it.

"This is the magnetic record. I've reduced the sensitivity of one of the recorders until it no longer shoots off the paper. You can see exactly what's happening now. At these points the field starts to rise rapidly to over a thousand times its normal value. It stays that way for a couple of minutes and then drops back to normal—so."

With his finger Jones traced the rise and fall of the magnetic field. "There are two things to note. The rise isn't instantaneous but takes just over a second in each case. It seems to be exponential. That's just what happens, of course, when you switch on the current in an electromagnet. And the fall is just the same while the plateau in between is perfectly flat. The whole thing is obviously artificial."

"That's exactly what I said in the first place! But there's no such magnet on the Observatory!"

"Wait a minute—I haven't finished yet. You'll see that the field jumps up at fairly regular intervals and I've carefully noted the times at which it's come on. I've had the whole staff going through the tapes of every automatic recorder in the place to see if anything else has happened at the same instants."

"Quite a lot has—nearly all the records show some fluctuations. The cosmic ray intensity, for instance, falls off when the field goes on. I suppose all the primaries are being swept into it so that we don't receive them. But the oddest of all is the seismograph tape."

"*Seismograph!* Who ever heard of a magnetic moonquake?"

"That's what I thought at first, but here it is. Now if you look carefully you can see that each of the little moonquakes arrives just about a minute and a half after the jolt in the magnetic field, which presumably travels at the velocity of light. We know how fast waves travel through the lunar rock—it's about a mile a second."

"So we are forced to the conclusion that about a hundred miles away someone is switching on the most colossal

magnetic field that's ever been made. It's so huge it wrecks our instruments, which means that it must run into millions of gauss.

"The earthquake—sorry, moonquake—must be a secondary effect. There's a lot of magnetic rock round here and I imagine it must get quite a shock when that field goes on. You probably wouldn't notice the quake even if you were where it started but our seismographs are so sensitive they'll spot meteors falling anywhere within twenty miles."

"That's about the best piece of high-speed research I've ever encountered."

"Thanks, but there's still more to come. Next I went up to Signals to find if they'd noticed anything. And were they in a rage! All communication has been wrecked by bursts of static at exactly the same instants as our magnetic barrages. What's more they'd taken bearings on the source—and with my ranges we have it pinpointed exactly. It's coming from somewhere in the Sea of Rains, about five miles south of Pico."

"Holy smoke!" said Wheeler. "We might have guessed!"

The two physicists pounced on him simultaneously. "Why did you say that?"

Remembering his promise Wheeler looked hesitantly at Jamieson, who came to the rescue. "We've just come back from Pico. There's a Government research project going on out there. Very hush-hush—you can't get near the place. It's a big dome out on the plain, at least twice the size of the Observatory. Must have a lot of stuff in it from what they say."

"So *that's* what those ships are doing out over the *Mare*. Did you have a chance to see anything?"

"Not a thing."

"Pity—we must take a trip across."

"I shouldn't if I were you. They were very polite to us—but next time I think it might be different. They told us they didn't want visitors."

"So you got into the place then?"

"Yes."

"What a waste. They *would* let in a couple of dumb astronomers who wouldn't know a dynamo from a transformer. Now we won't have a chance."

"Oh, I suppose you'll know all about it some day."

#### IV

**I**T WAS one of those remarks that was to come true sooner than anyone could have expected. For the rumors had been correct—the greatest of all uranium deposits had been discovered on the Moon. And the Federation knew it.

Looking back from our vantage point upon events now safely buried in history we can see the merits of both sides. The rulers of Earth honestly feared the Federation and its revolutionary ideals. The fear was not entirely rational—it was born of a deeper subconscious realization that Earth's pioneering days were done and that the future lay with those who were already at the frontiers of the Solar System, planning the first onslaught against the stars.

Earth was weary after her epic history and the effort she had put forth to conquer the nearer worlds—those worlds which had so inexplicably turned against her as long ago the American colonies had turned against their motherland. In both cases the causes were similar and in both the eventual outcomes equally advantageous to mankind.

Only for one thing would Earth still fight—for the preservation of a way of living which, although outmoded, was all she knew. Let us not therefore too harshly judge those leaders who, fearing the mounting strength of the Federation, attempted to deprive it of the metal which would have given it almost limitless power.

For its part the Federation had not been free from blame. Amongst the idealists and scientists, who had been

attracted by the promise of the outer worlds, were not a few men of more ruthless breed, men who had long known that a breach with Earth would one day be inevitable. It was these who had planned the research which culminated in the cruisers Acheron and Eridanus and later the superdreadnought Phlegethon.

Those ships were made possible by the invention of the Wilson or accelerationless drive. So universal is the Wilson drive today that it is difficult to realize it was being perfected in secret for ten years before the Solar System learned of its existence. Around that drive the Federation built its three warships and their armament.

Even today little has been revealed of the weapons with which the Battle of the Plain was fought. Atomic power and the tremendous development of electronic engineering during the twentieth century had made them possible. It was never intended that these fearful weapons be used—the mere revelation of their existence would, it was hoped, wring the necessary concessions from Earth.

It was a dangerous policy but one which might have worked had not Earth possessed a superb intelligence service. When at last the Federation put forth its strength, countermeasures had already been taken. In addition Earth had by supreme good fortune just discovered a branch of radiation physics which made possible a weapon of which its opponents knew nothing and against which they had no defense.

The Federation, expecting no opposition whatsoever, had made the age-old mistake of underestimating its opponent.

\* \* \* \* \*

It was nightfall on the Observatory meridian. All the free members of the staff had gathered, as was the custom, around the observation windows to say farewell to the Sun they would not see

again for fourteen days. Only the highest mountain peaks were still catching the last slanting light. Long since the valleys had been engulfed in darkness. The Sun's disc was already invisible. As the minutes crawled by the splendor died slowly on the blazing mountain spires as though reluctant to leave them.

And now only a blazing peak could still be seen, far out over the hidden ramparts of the Alps. The Sea of Rains had been in darkness for many hours but Pico's inaccessible crown had not yet sunk into the cone of night sweeping round the Moon. A lonely beacon, it still defied the gathering dusk.

In silence the little group of men and women watched the darkness flooding up the great mountain's slopes. Their remoteness from Earth and the rest of the human race made more poignant the sense of sadness that is the heritage of Man whenever he watches the setting of the Sun.

The light ebbed and died on the distant peak—the long lunar night had begun. When in fourteen days the Sun rose again it would look down upon a vastly different Sea of Rains. The astronomers had paid their last respects to the proud mountain that seemed the very symbol of eternity. When the dawn came it would have vanished forever.

**D**URING the next two weeks, there was little relaxation for anyone at the Observatory. Wheeler and Jamieson, who were studying the light curves of variable stars in the Andromeda nebula, had been allotted the use of the thousand-inch telescope for one hour in every thirty. Nearly a score of other research programs had to be dovetailed according to an elaborate timetable—and woe betide anyone who tried to exceed his allowance!

The dome of the Observatory was now open to the stars and the astronomers were wearing light space-suits which scarcely restricted their move-

ments. Wheeler was taking a series of photometer readings which his colleague was recording when their suit radios began to hum with life. A general announcement was coming through. These were very common and the two men took no notice until they realized that it was directed at them.

"Will Dr. Jamieson please report to the Director at once? Dr. Jamieson to report to the Director at once, please."

Wheeler looked at his companion in surprise. "Hello, what have *you* been up to? Bad language again on the station frequency?"

This was the commonest crime in the Observatory. When one was wearing a space-suit it was often difficult to remember that the person being addressed was not necessarily the only listener. The possible indiscretions were legion and most of them had been committed at one time or another.

"No, *my* conscience at any rate is clear. You'll have to get someone else to finish this job. See you later."

In spite of his confidence Jamieson was relieved to find the Director in a friendly though worried mood. He was not alone. Sitting in his office was a middle-aged man nursing a briefcase and wearing clothes that indicated he had only just arrived. The Director wasted no time in formalities.

"Jamieson, you're the best tractor driver we have. I gather that you have been to the new establishment out in the *Mare Imbrium*. How long would it take you to get there?"

"What—now?—at night?"

"Yes."

Jamieson stood speechless for a moment, completely taken aback by the proposal. He had never driven at night. Only once had he been out as late as a day before sunset and that was bad enough. The inky shadows had lain everywhere, indistinguishable from crevasses. It needed a violent effort of will to drive into them—and even worse the real crevasses were indistinguishable from shadows.

The Director, seeing his hesitation, spoke again. "It won't be as bad as you think. The Earth's nearly full and there'll be plenty of light. There's no real danger if you're careful—but Dr. Fletcher wants to get to Pico in three hours. Can you do it?"

Jamieson was silent for a moment. Then he said, "I'm not sure but I'll try. Is it permissible to ask what this is all about?"

The Director glanced at the man with the briefcase. "Well, Doctor?"

The other shook his head and answered in a quiet and unusually well-modulated voice, "Sorry—I can only tell you that I've got to reach the installation as soon as humanly possible. I was on my way by rocket when the underjets started to cut and we had to come down at Aristillus.

"It will take twenty-four hours to fix the ship, so I decided to go on by tractor. It's only taken me three hours to get here but they told me I'd need an Observatory driver for the next lap. In fact, they mentioned you."

Jamieson was somewhat amused by the mixture of encouragement and flattery. "The road to Aristillus happens to be the only decent highway on the Moon," he said. "I've done a hundred on it before now. You'll find things very different out on the *Mare*—even in daylight, thirty's a good average. I'm perfectly willing to have a shot at it but you won't enjoy the ride."

"I'll take that risk—and thanks for helping."

Jamieson turned to the Director. "How about getting back, Sir?"

"I leave that entirely to you, Jamieson. If you think best stay there until morning. Otherwise come back as soon as you've had a rest. Whom do you want as a second driver?"

**I**T WAS a stringent rule that no one could leave the Observatory without a companion. Apart from the danger of physical accident the psychological effect of the lunar silences upon an iso-

lated man was sometimes enough to unbalance the sanest minds.

"I'll take Wheeler, sir."

"Can he drive?"

"Yes, I taught him myself."

"Good. Well, the best of luck—and don't come back until dawn unless you feel perfectly safe."

Wheeler was already waiting at the tractor when Jamieson and the stranger arrived. The Director must have called him and given him full instructions, for he carried a couple of suitcases with his own and Jamieson's personal belongings. They hoped it would not be necessary to spend the seven days until dawn at the radio station but it was best to be prepared.

The great outer doors of the "Stable," as the tractor garage was called, slid smoothly open and the artificial light flooded out onto the roadway. There was a faint scurry of dust as the air rushed out of the lock. Then the tractor moved slowly forward through the open doors.

The roadway down the mountain looked very different now. A fortnight earlier, it had been a blinding ribbon of concrete, baking in the glare of the noonday Sun. Now it seemed almost self-luminous under the blue-green light of the gibbous Earth, which dominated a sky so full of stars that the familiar constellations were almost lost. The coastline of western Europe was clearly visible but the Mediterranean area was blotted out by dazzling clouds, too bright to look upon.

Jamieson wasted no time in sightseeing. He knew the road perfectly and the light was superb—safer than daylight because less overpowering. Out in the treacherous shadows of the Sea it would be very different but here he could do eighty with ease.

It seemed to Wheeler that the ride down the mountain road was even more shattering than it had been during the day. The ghostly quality of the Earthlight made it difficult to judge distances but the landscape was sliding past at an

appalling speed.

He glanced at the mysterious passenger, who seemed to be taking the ride very calmly. It was time to strike up an acquaintance—besides, he was anxious to discover what the whole business was about. Perhaps a calculated indiscretion might produce useful results.

"It's rather lucky we've been this way before," began Wheeler. "We visited the new radio station only a fortnight ago."

"Radio station?" said the passenger, his surprisingly level voice betraying just a trace of perplexity.

Wheeler was taken aback. "Yes, the place we're going to."

The other looked puzzled. Then he asked in a quiet voice, "Who told you what it was?"

Wheeler decided to be a little more discreet. "Oh, we managed to see a bit of the place while we were over there. I took a course in elementary electronics at Astrotech and recognized some of the gear."

For some reason the other appeared highly amused. He was about to reply when suddenly the tractor gave a jolt which roughly shot them both into the air.

"Better hang on to your seats now," called Jamieson over his shoulder. "This is where we leave the road. I think the suspension can take it—thank goodness I've just had it checked."

For the next few miles Wheeler was too breathless to do any further talking but he had time to think over his passenger's surprising reactions. Certain doubts began to form in his mind. Who, for example, had ever heard of a radio station generating colossal magnetic fields?

Wheeler looked at his passenger again, wishing he could read minds. He wondered what was in that tightly held briefcase with the triple locks. There were initials on it—he could just see them—J.A.F. They conveyed nothing to him.

DOCTOR James Alan Fletcher, Ph.D., was not at all happy. He had never been in a tractor before and sincerely hoped he never would be again. Up to the present his stomach had behaved itself but a few more jolts like the last would be too much for it. He was glad to see that the machine's thoughtful designers had foreseen such accidents and made certain provisions for them. That at least was reassuring.

Jamieson was sitting intently at the controls and had not spoken again since leaving the road. The ground over which the tractor was now traveling seemed bumpy but safe and the machine was averaging about fifty miles an hour. Presently it would enter a range of low hills a few miles ahead and its speed would be considerably reduced. So far, however, Jamieson had managed to avoid the shadows which the Earthlight was casting from every rise in the ground.

Fletcher decided to ignore the landscape outside. It was too lonely and overpowering. The brilliant light of the mother world—fifty times as bright as the full Moon on Earth—enhanced rather than diminished the impression of frightful cold. Those whitely gleaming rocks, Fletcher knew, were colder than liquid air. This was no place for man.

By comparison the tractor's interior was warm and homey. There were touches that brought earth very close. Who, Fletcher wondered, had been responsible for the photograph of a certain famous television star which was pinned against one wall? Wheeler caught his enquiring gaze and with a grin jerked his thumb towards the intent curve of Jamieson's back.

Suddenly darkness fell with an abruptness that was shocking. Simultaneously Jamieson brought the tractor almost to a halt. The twin beams of the machine's dirigible searchlights began to roam over the ground ahead and Fletcher realized that they had entered the shadow of a small hill. For the first



time he understood what the lunar night really meant.

Slowly the machine edged forward at five or ten miles an hour, the searchlights anxiously exploring every foot of the ground ahead. For twenty minutes the agonizingly slow progress continued. Then the tractor surmounted a rise and Fletcher was forced to shield his eyes from the glare of Earthlight on the rocks ahead. The shadow fell away as the machine picked up speed again and the welcome disc of the Earth appeared in the sky.

Fletcher looked at his watch and was surprised to see that they had been on their way less than fifty minutes. It was two minutes to the hour and automatically his eyes went to the radio. "Mind if I switch on the news?"

"Go right ahead—it's tuned to Manilius I, but you can get Earth direct if you want to."

The great lunar relay station came in crystal clear with no trace of fading. During the hours of darkness the Moon's feeble ionosphere had been completely dispersed and there were no reflected signals to interfere with the ground ray.

Fletcher was surprised to see that the tractor chronometer was over a second fast. Then he realized that it was set to lunar time, that the signal he was listening to had just bridged the quarter million miles gulf from Earth. It was a chilling reminder of his remoteness from home.

Then there came a delay so long that Wheeler turned up the volume to check that the set was still operating. After a full minute the announcer spoke, his voice striving desperately to be as impersonal as ever. "This is Earth calling. The following statement has just been issued from Berne—"

"The Federation of the Outer Planets has informed the Government of Earth that it intends to seize certain portions of the Moon and that any attempt to resist this action will be countered by force.

"This Government is taking all necessary steps to preserve the integrity of the Moon. A further announcement will be issued as soon as possible. In the meantime it is emphasized that there is no immediate danger as there are no hostile ships within twenty hours' flight of Earth.

"This is Earth. Stand by."

## V

A SUDDEN silence fell. Only the hiss of the carrier and the faint crackle of infinitely distant static still issued from the speaker. Jamieson had brought the tractor to a halt and had turned around in his seat to face Fletcher.

"So this is why you are in such a hurry," he said quietly.

Fletcher nodded. Color was slowly draining back to his face. "We did not expect it so soon."

There was a pause during which Jamieson made no effort to restart the tractor. Only the nervous drumming of Fletcher's fingers on his briefcase betrayed his tension. Then Jamieson spoke again. "And will this journey of yours make any real difference?"

Fletcher looked at him for a long time before he answered. "I'll tell you when we get there," he said. "Now, for God's sake, start driving!"

There was a long silence. Then Jamieson turned back to the controls and restarted the engine. "You'll be there in ninety minutes," he said.

He did not speak again during the journey. Only Wheeler realized what it must have cost him to make his decision. That Jamieson's loyalties were divided he could understand, for there were few scientists who did not share many of the Federation's nobler ideals. He was glad that Jamieson had gone forward, yet if he had turned back he would have respected his motives none the less.

The radio was now pouring out a stream of unintelligible coded instruc-

tions. No further news had come through and Wheeler wondered just what steps were being taken to defend the Moon. There was nothing that could be done in a few hours though the final touches could be put to plans already prepared. He began to suspect the nature of Fletcher's mission.

The latter had now opened his briefcase. It was full of photostats of extremely complicated circuits which he made no attempt to conceal. A single glance showed Wheeler that any secrecy was unnecessary for the mass of symbols and wiring was completely meaningless to him. Fletcher was ticking off various amendments against a list of corrections, as if making some final check. Wheeler could not help thinking that he was probably doing it more to pass the time than anything else.

FLETCHER was not a brave man—seldom in his life had he known the need for so primitive a virtue as physical courage. He was rather surprised at his absence of fear, now that the crisis was almost upon him. Well before dawn, he knew, he would probably be dead.

The thought gave him more annoyance than fear. It meant that his paper on wave propagation, all his work on the new beam, would remain unfinished. And he would never be able to claim the massive traveling allowance he had been planning as compensation for this frightful ride across the Sea of Rains.

A long time later a cry from Wheeler broke into his reverie. "Here we are!"

The tractor had surmounted a rise in the ground. Still a good many miles ahead the great metal dome was glinting in the Earthlight. It seemed utterly deserted but within, Fletcher knew, it would be seething with furious activity.

A searchlight reached out and speared the tractor. Jamieson drove steadily forward. He knew it was only a symbol, that for many miles invisible radiations had been scrutinizing them intently. He flashed the identification

letters of the machine and raced forward over the nearly level ground.

The tractor came to a halt in the monstrous shadow of the dome. Men were awaiting them by the airlock. Fletcher was already wearing his space-suit and his hand was on the door almost before the tractor came to a stop. "Just wait here a minute," he said, "while I find what's happened."

He was through the lock before the others could say a word. They saw him give a few hasty instructions and then he disappeared into the dome.

He was gone for less than five minutes, though to the astronomers fretting in the tractor it seemed an age. Abruptly he was back, the outer door of the airlock slamming violently behind him. He was in far too much of a hurry to remove his helmet and his voice came muffled through the plastic sphere.

"I haven't time for explanation," he said, addressing Jamieson, "but I'll keep the promise I made you. This place"—he gestured towards the dome—"covers the uranium the Federation wants to get. It's well defended and that's going to give our greedy friends a bit of a shock. But it has offensive armament as well. I designed it, and I'm here to make the final adjustments before it can go into action. So that answers your question about the importance of this journey.

"The Earth may owe you a greater debt than it can ever pay. Don't interrupt—this is more important. The radio was wrong about the twenty hours of safety. Federal ships have been detected a day out—but they're coming in ten times as fast as anything that's ever gone into space before. We've not much more than an hour left before they get here.

"You could stay, but for your own safety I advise you to turn round and drive like hell back to the Observatory. If anything starts to happen while you're still out in the open get under cover as quickly as possible. Go down into a crevasse—anywhere you can find

shelter—and stay there until it's over. Now good-bye and good luck."

HE WAS gone again before either of the two men could speak. The outer door slammed once more and the *Airlock Clear* indicator flashed on. They saw the dome entrance snap open and close behind him. Then the tractor was alone in the building's enormous shadow.

Nowhere else was there any sign of life but suddenly the framework of the machine began to vibrate at a steadily rising frequency. The meters on the control panel wavered madly, the lights dimmed and then it was all over.

Everything was normal again but some tremendous field of force had swept out from the dome and was even now expanding into space. It left the two men with an overpowering impression of energies awaiting the signal for their release. They began to understand the urgency of Fletcher's warning. The whole deserted landscape seemed tense with expectation.

Swiftly the caterpillar backed away from the dome and spun around on its tracks. Its twin searchlights threw their pools of light across the undulating plain. Then at full speed it tore away into the lunar night. Jamieson realised that the more miles he could put between himself and the mine the greater their chances of ever reaching the Observatory again.

\* \* \* \* \*

Dr. Molton was passing through the gallery of the thousand-inch dome when the first announcement electrified the Observatory. Through all the speakers and over the radio of every space-suit in the station the Director's voice came roaring.

*"Attention everybody! The Federation is about to attack the Moon. All members of the staff, with the exception of the telescope crew, are to go to the vaults immediately. I repeat, im-*

*mediately. The telescope crew will remove the mirror at once and will take it to the resurfacing room. That is all. Move!"*

For a dozen heartbeats the life of the Observatory came to a standstill. Then with a slow majestic motion the thousand-ton shutters of the dome closed like folding petals. Air began to pour into the building from hundreds of vents as the telescope swung around to the vertical and the work of removing the mirror from its cell began.

When he started to run, Dr. Molton found that his legs seemed to have turned to water. His hands were trembling as he opened the nearest emergency locker and chose a space-suit that approximately fitted him. Though he was not one of the telescope crew he had work to do in the dome now that the emergency had arrived. There were the precious auxiliary instruments to be dismantled and removed to safety and that job alone would take hours.

As he began his work with the rest of the team, Molton's jangling nerves slowly returned to normal. Perhaps, after all, nothing serious would happen. Twenty years ago it had been a false alarm. Surely the Federation would not be so foolish—he checked his thoughts with a wry grimace. It was just such wishful thinking on Wheeler's part that had opened their discussion a fortnight ago. How he wished that Wheeler had been right!

Swiftly the minutes fled by as one by one the priceless instruments went down into the vaults. The great mirror was now free in its cell and the hoists had been attached to the supporting framework. No one had noticed the passage of time.

Glancing up at the clock Molton was amazed to see that nearly two hours had passed since the first radio warning. He wondered when there would be any further news. The whole thing still seemed a fantastic dream. The thought of danger was inconceivable in this re-

mote and peaceful spot.

The mirror-truck moved soundlessly up the ramp into its position beneath the telescope. Inch by inch the immense disc was lowered until the hoists could be removed. The whole operation had taken two hours and fifteen minutes—a record which was never likely to be surpassed.

The truck was now halfway down the ramp. Molton breathed a sigh of relief—his work also was nearly finished. Only the spectroscope had to be moved and— *What was that?*

The whole building suddenly trembled violently. A shudder ran through the mighty framework of the telescope. For a moment the space-suited figures swarming round its base stood motionless. Then there was a concerted rush to the observation windows.

It was impossible to look through them. Far out above the Sea of Rains something was blazing with a brilliance beyond all imagination. The Sun itself by comparison would have been scarcely visible.

Again the building trembled and a deep organ note ran through the mighty girders of the telescope. The mirror truck was now safely away, descending deep into the caverns far down in the solid rock. No conceivable danger could harm it there.

And now the hammer-blows were coming thick and fast with scarcely a pause between them. The rectangles of intolerable light cast by the observation windows on the floor and walls of the dome were shifting hither and thither as if their sources were moving swiftly round the sky.

Molton ran to get some sun filters so that he could look out into the glare without wrecking his eyes. But he was not allowed to do so. Once again the Director's voice came roaring from the speakers. "*Down into the vaults at once! Everybody!*"

As he left the dome Molton risked one backward glance over his shoulder. It seemed as if the great telescope were

already on fire, so brilliant was the light flowing through the windows from the inferno outside.

Strangely enough Molton's last thought as he went down to the vaults was not for his own safety nor that of the priceless telescope. He had suddenly remembered that Wheeler and Jamieson were somewhere in the Sea of Rains. He wondered if they would escape whatever hell was brewing out there on the barren plain.

Quite unaccountably he recalled Wheeler's ready smile, the fact that he had never been long absent even during those frequent periods when he was officially in disgrace. And Jamieson too, though quieter and more reserved, had been an intelligent and friendly colleague. The Observatory would miss them badly if they never returned.

THE storm broke when Jamieson had driven scarcely a dozen miles from the dome, for the speed of the oncoming ships had been grossly underestimated. Earth's far-flung detector screens had been designed to give warning of meteors only and these machines were infinitely faster than any meteor that had ever entered the Solar System.

The instruments had flickered once and then the ships were through. They had not even started to check their speed until they were a thousand miles from the surface of the Moon. In the last few miles of their trajectory the accelerationless drive had brought them to rest at nearly half a million gravities.

There was no warning of any kind. Suddenly the grey rocks of the Sea of Rains were lit with a brilliance they had never before known in all their history. Paralyzed by the glare Jamieson brought the tractor to a grinding halt until his eyes had readjusted themselves.

His first impression was that someone had turned a searchlight upon the machine. Then he realized that the source of the light was many miles overhead. High against the stars,

which it had dimmed almost to extinction, an enormous rocket flare was guttering and dying. As he watched, it slowly faded and for a little while the stars returned to their own.

"Well," said Wheeler in an awed voice, "I guess this is it."

Hanging motionless against the Milky Way were the three greatest ships that the two astronomers, or indeed most men, had ever seen. It was not possible to judge their distance—one could not tell whether they were ten or twenty miles overhead. They were so huge that the sense of perspective seemed somehow to have failed.

For several minutes the great ships made no attempt to move. Once again, though this time with even more reason, Jamieson felt the sense of brooding expectancy he had known in the shadow of the dome. Then another flare erupted amongst the stars and the world outside the tractor was overwhelmed with light. But as yet the ships had made no hostile move.

The commander of the Phlegethon was still in communication with Earth though he realized now that there was no hope of avoiding conflict. He was bitterly disappointed—he was also more than a little puzzled by the tone of quiet confidence with which Earth had rejected his ultimatum. He still did not know that the building below him was anything other than a mine. A mine it certainly was but it had kept its other secrets well.

The time limit expired—Earth had refused even to reply to the last appeal. The two watchers below knew only that one of the great ships had suddenly spun on its axis so that its prow pointed towards the Moon. Then, soundlessly, four arrows of fire split the darkness and plunged toward the plain.

"Rocket torpedoes!" gasped Wheeler. "Time we started to move!"

"Yes—into your space-suit! I'll drive Ferdie between those rocks but we'll have to leave him there. We passed a crack just now that will protect us from

anything except a direct hit. I made a note of it at the time but didn't think we'd have to use it so quickly."

The rock-borne concussion reached them as they were struggling with the fittings of their space-suits. The tractor was jerked off the ground and slammed back with a jar that almost knocked them off their feet.

"If that scored a hit the mine's done for!" exclaimed Wheeler. "How can they fight back anyway? I'm sure they've got no guns there."

"We certainly wouldn't have seen them if they had," grunted Jamieson as he adjusted his helmet. He finished his remarks over the suit radio. "Ready now? Okay—out we go!"

Wheeler felt very reluctant to leave the warmth and security of the tractor. Jamieson had left it in the shelter of a group of boulders which would protect it from almost all directions. Only something dropping from above could do it any damage.

Wheeler was suddenly struck by an alarming thought. "If Ferdinand gets hit," he said, "that's the end of us anyway. So why bother to leave?"

"There's air in these suits for two days," answered Jamieson as he closed the door of the lock behind him. "We can walk back if we have to. Eighty miles sounds like a lot but it isn't so much on the Moon."

**W**HEELER said no more as they hurried to their shelter. An eighty-mile walk over the Sea of Rains was a sombre thought.

"This would have made a fine fox-hole in the last war," he said as he settled himself down among the debris of lava and pulverized rock at the bottom of the little ravine. "But I want to see what's going on over by the mine."

"So do I," said Jamieson, "but I also want to live to a ripe old age."

"I'll risk it," exclaimed Wheeler impetuously. "Everything seems quiet now anyway. I think those torpedoes must have finished the job." He jumped to-

ward the rim of the cleft and hauled himself out.

"What can you see?" asked Jamie-son. His voice reached Wheeler easily though the suit's low-powered radio was heavily shielded by the solid rock.

"Wait a minute—I'm climbing up on this boulder to get a better view."

There was a short pause. Then Wheeler spoke again with a note of surprise in his voice. "The dome doesn't seem to be touched. Everything's just the same."

He was not to know that the first warning shots had landed many miles away from the mine. The second salvo of rockets was launched soon after he had reached his vantage point. This time they were intended to hit. Wheeler saw the long sheafs of flame driving steady and true towards their target. In a moment, he thought, that great dome would collapse like a broken toy.

The rockets never reached the surface of the Moon. They were still many miles up when, simultaneously, they exploded. Four enormous spheres of light blossomed amongst the stars and vanished. Automatically Wheeler braced himself for the concussion that could never come in the vacuum around him.

Something strange had happened to the dome. At first Wheeler thought that it had grown in size. Then he realized that the dome itself had gone and in its place was a wavering hemisphere of light, scarcely visible to the eye. It was like nothing he had ever seen before.

It was equally unfamiliar to the Federation ships. In a matter of seconds they had dwindled into space, shrinking under the drive of an inconceivable acceleration. They were taking no chances while they went into conference and hastily checked the armament they had never imagined they would have to use. Rather late in the day they understood the reason for Earth's quiet confidence.

They were gone only a brief while. Although they had disappeared together they returned from entirely different directions as if to confuse the

defenses of the mine. The two cruisers came down at steep angles from opposite corners of the sky and the battleship swept up over the horizon behind the screen of Pico, where it remained for the earlier part of the conflict.

Suddenly the cruisers vanished, as the dome had vanished, behind wavering spheres of light. But these spheres were already brilliant, shining with a strange orange glow. Wheeler realized that they must be radiation screens of some kind and as he looked again towards the mine he knew that the onslaught had begun.

The hemisphere on the plain was blazing with all the colors of the rainbow and its brilliance was increasing second by second. Power was being poured into it from outside, power that was being converted into the harmless rays of the visible spectrum. That at least was clear to Wheeler—he wondered how many millions of horsepower were flowing invisibly through the space between the cruisers and the mine. It was already far brighter than day.

Slowly understanding came to him. The rays which the twentieth century had imagined but never known were a myth no longer. Not like the space-ship, gradually and over many years, had they come upon the world. In secrecy, during the seventy years of peace, they had been conceived and brought to perfection.

The dome on the plain was a fortress, such a one as no earlier man had ever dreamed of before. Its defenses must have gone into action immediately the first beams of the enemy reacted upon them but for many minutes it made no attempt at retaliation. Nor yet was it in any position to do so, for under the blazing shield that protected them Fletcher and his colleagues were fighting time as well as the Federation.

Then Wheeler noticed a faint brush discharge on either side of the dome—that was all. But the screens of the cruisers turned cherry-red, then blue-white, then a color he knew but had



never thought to see on any world—the violet-white of the giant suns. So breathtaking was the sight that he gave no second thought to his deadly peril. Only imminent personal danger could move him now—whatever the risk, he must see the battle to its end.

Jamieson's anxious voice startled him when it came again over the speaker. "Hello, Con! What's happening?"

"The fight's started—come up and see."

For a few seconds Jamieson struggled against his natural caution. Then he emerged from the cleft and side by side the two men watched the greatest of all battles rising to its climax.

## VI

**M**ILLIONS of years ago the molten rock had frozen to form the Sea of Rains and now the weapons of the ships were turning it once more to lava. Out by the fortress clouds of incandescent vapor were being blasted into the sky as the beams of the attackers spent their fury against the unprotected rocks.

Ever and again a salvo of rocket torpedoes would lance toward the Moon and a mountain would rise slowly from the plain and settle back in fragments. None of the material projectiles ever reached their target, for the fields of the fortress deflected them in great spirals that sent many hurtling back into space.

Not a few were caught in the beams of the defenders and detonated many miles above the ground. The utter silence of their explosions was unnerving. Wheeler found himself continually preparing for the concussion that could never come—not on the atmosphereless Moon.

It was impossible to tell which side was inflicting more damage. Now and again a screen would flare up as a flicker of heat passed over white-hot steel. When that happened to one of the

cruisers it would move with an acceleration that could not be followed by the eye and it would be several seconds before the focusing devices of the fort could find it again.

The fort itself had to take all the punishment the ships could give it. After the battle had been on for a very few minutes it was impossible to look toward the south because of the glare. Ever and again the clouds of rock vapor would go sailing up into the sky, falling back to the ground like luminous steam. And all the while a circle of lava was creeping out from the base of the fortress, melting down the hills like lumps of wax.

During the whole of the engagement the two men spoke scarcely a dozen words. This was no time for talk—they knew that they were witnessing a battle of which all the ages to come would speak with awe. Even if they were killed by the stray energies reflected from the screens of the fortress it would have been worth it to have seen so much.

They were watching the cruisers, for it was possible now and then to look at them without being blinded, when suddenly they realized that the glare to the south had doubled its intensity. The battleship, which until now had taken no part in the action, had risen above Pico and was blasting at the fortress with all the weapons she possessed.

From where he was standing Wheeler could see the throats of her bow projectors—little pits of flame that looked as if they had been carved from the Sun. The summit of the mountain had been caught in those beams. It did not have time to melt—the peak vanished and only a ragged smoking plateau was left.

Wheeler was going to risk no further damage to his eyes, which were already paining him. With a word of explanation to Jamieson he raced back to the tractor and returned a few minutes later with a set of heavy-duty filters.

The relief was immense. No longer were the screens of the cruisers like

artificial suns and they could look once more in the direction of the fortress. Though he could see only the ray-shields against which the beams of the battleships were still splashing in vain it seemed to Wheeler that the hemisphere had lost its original symmetry during the battle.

At first he thought one of the generators might have failed. Then he saw that the lake of lava was at least a mile across and he knew that the whole fort had floated off its foundations. Probably the defenders were scarcely aware of the fact. Their insulation was taking care of solar heat and would hardly notice molten rock.

And now a strange thing was beginning to happen. The rays with which the battle was being fought were no longer quite invisible, for the fortress was no longer in a vacuum. Around it the boiling rock was releasing enormous volumes of gas through which the paths of the rays were as clearly visible as searchlights on Earth on a misty night.

At the same time Wheeler began to notice a continual hail of tiny particles around him. For a moment he was puzzled. Then he realized that the rock vapor was condensing after it had been blasted up into the sky. It seemed too light to be dangerous and he did not mention it to Jamieson.

As long as it was not too heavy the insulation of the space-suits could deal with it.

Accustomed though they were to the eternal silences of the Moon both men felt a sense of unreality at the sight of those tremendous weapons blasting overhead without a whisper of sound. Now and then there would be a hammerblow underfoot as a torpedo crashed, deflected by the fields of the fort. But most of the time there was absolute silence, even when there were half a dozen rockets detonating in the sky at once. It was like watching a television program when the sound had failed.

THEY never knew why the fortress waited so long before it used its main weapon. Possibly Fletcher could not get it into action earlier or perhaps he was waiting for the attack to slacken so that some energy could be diverted from the screens. For it was during a lull in the engagement that the polaron beam operated for the first time in history.

The two watchers saw it strike upward like an inverted lightning flash. It was clearly visible along its whole length, not merely in patches where it passed through dust and gas. Even in that brief instant of time Wheeler noticed this staggering violation of the laws of optics and wondered at its implications. Not until many years later did he learn how a polaron beam radiates some of its energy at right angles to its direction of propagation so that it can be seen even in a vacuum.

The beam went through the *Phlegethon* as if she did not exist. The most terrible thing Wheeler ever saw in his life was the way the screens of that great ship suddenly vanished as her generators died, leaving her helpless and unprotected in the sky. The secondary weapons of the fortress were at her instantly, tearing out great gashes of metal and boiling away her armor layer by layer.

Then, quite slowly, she began to settle towards the Moon, still on an even keel. No one will ever know what stopped her—probably some short-circuit in her controls since none of her crew could have been left alive. For suddenly she went off to the west in a long flat trajectory.

By that time most of her hull had been boiled away and the steel skeleton of her framework was almost completely exposed. The crash came minutes later as she plunged into the mountains beyond Plato.

When Wheeler looked again for the cruisers they were so far away that their screens had shrunk to little balls of fire against the stars. At first he

thought they were retreating—then abruptly the screens began to expand as they came down in an attack under terrific vertical acceleration. Around the fortress the lava was throwing itself madly into the sky as the beams tore into it.

The cruisers came out of their dives about a mile above the fort. For an instant they were motionless—then they went back into the sky together. But the *Eridanus* had been mortally wounded though the two watchers knew only that one of the screens was shrinking much more slowly than the other.

With a feeling of helpless fascination they watched the stricken cruiser fall back toward the Moon. About twenty miles up her screens seemed to explode and she hung unprotected, a sleek torpedo of black metal, visible only as a shadow against the stardust of the Milky Way.

Almost instantly her light-absorbing paint and the armor beneath were torn off by the beams of the fortress. The great ship turned cherry-red, then white. She swung over so that her prow pointed toward the Moon and began her last dive.

Wheeler felt his friend's grip upon his arm and Jamieson's voice rang through the speakers. "Back to the cleft for God's sake!"

He never knew how they reached the cleft in time and had no recollection of entering it. The last thing Wheeler saw was the remaining cruiser dwindling into space and the *Eridanus* coming down at him like an onrushing meteor. Then he was lying flat on his face among the rocks, expecting every moment to be his last.

She landed nearly five miles away. The impact threw Wheeler a yard off the ground and set the boulders dancing in the cleft. The whole surface of the plain quivered for seconds before the rocks settled back to rest.

Wheeler turned over on to his back, breathless, and looked up at the gibbous Earth that was just visible from his

position. He wondered what Earth had thought of the battle, which must have been clearly visible to the naked eye over the hemisphere facing the Moon. But his main feeling was relief at his escape. He did not know that the final paroxysm was yet to come.

Jamieson's voice brought him back to life. "You all right, Con?"

"Yes—I think so. That's two of them gone. By the way she was traveling I don't think number three will be coming back."

"Nor do I. Looks as if Earth's won the first round. Shall we go back to the tractor?"

"Just a minute—*what's the matter with those rocks up there?*"

Wheeler glanced towards the northern face of the cleft, which was several feet higher than the other. Over the exposed surfaces of the rock waves of light were passing in slow undulations.

Jamieson was the first to realize the cause. "It's the glare from that lava over by the fort. It will probably take a good while to cool off."

"It isn't cooling. Look—it's getting brighter!"

At first Wheeler had blamed his eyes but now there was no room for doubt. The rock was not merely reflecting light—it was turning cherry-red. Soon it was too bright to watch with the unprotected eye. With a feeling of sick helplessness he saw that everywhere the exposed rock surfaces were becoming incandescent.

Suddenly the appalling truth reached Wheeler's brain. The generators of the wrecked ship had not yet detonated and the energy which it would have poured out in hours of continuous fighting was leaking away at a rate rising swiftly toward catastrophe. And he realized that all the atomic explosions of the past would be as nothing against what might happen now.

Then the Moon awoke from its sleep. The plain seemed to tear itself asunder and he could almost hear a mighty wind of radiation sweeping overhead. This

was the last thing he knew before the quake reached him.

**A**GES later he was awakened by the glare of Earthlight in his eyes. For a long time he lay in a half dazed condition, knitting together the broken threads of memory. Then he recalled what had happened and began to look around for his friend.

It gave him a shock to discover that his torch was broken. There was no sign of Jamieson in the narrow portion of the cleft illuminated by the Earth and he could not explore the shadows without a light. As he lay there wondering what to do next, a strange sound began to intrude upon his consciousness. It was an unpleasant rasping noise that grew stronger minute by minute.

Not since his childhood, when night had once caught him in a strange wood far from home had Wheeler known such real terror as he felt now. This was the airless Moon—there could be no sound here! Then his fuddled wits cleared and he burst into peals of relieved and half hysterical laughter.

Somewhere in the darkness near him Jamieson, still unconscious, was breathing heavily into his microphone.

Wheeler's laughter must have aroused his friend, for suddenly he heard Jamieson calling unsteadily through the speaker. "Hello, Con—what the devil's the matter?"

Wheeler took a firm grip of himself. "It's okay, Sid—I'm just a bit giddy. Are you all right?"

"Yes—at least I think so. But my head's still ringing."

"So is mine. Do you think it's safe to climb out now?"

"I don't see what else can happen now but I guess we'll have to wait here for a while. Look at that rock."

The walls overhead had been partly sheared away by the blast and were still glowing dully. The rock was too hot to touch and it was many minutes before the two men could crawl out of their refuge.

They were both prepared for a scene of devastation but the reality exceeded their wildest fears. Around them was a vision of the inferno. The whole landscape, from horizon to horizon, had altered beyond recognition. To the east the beautiful mountain that had been Pico was gone.

In its place was a sheared and blistered stump, only a fraction of its former height. It must have caught the full blast of that mammoth explosion. In all the plain, as far as the eye could see, there was no other outstanding projection. Of the fortress not a trace was left. Everything had been leveled by that final incredible blast of radiation.

That was Wheeler's first impression. Then he realized that it was not completely correct. About five miles away to the west was another pool of lava, a mile or two across, and in its center was a roughly hemispherical bulge. As he watched, it settled down into the molten rock until there was nothing left.

Then there came a faint trembling underfoot, and a curious disturbance at the center of the lake. Like some evil thing emerging from the sea a great column of lava slowly climbed towards the stars, tottered and slowly fell. So sluggish was its motion that it never reached the ground but froze even as it fell to form a crooked finger jutting out of the plain. And that was the end of the *Eridanus*.

Jamieson broke the long silence at last. "Ready to start walking?" he said.

**T**EN million miles away, the mortally wounded *Acheron* was limping back to Mars, bearing the shattered hopes of the Federation. On the second moon of Jupiter, white-faced men were sitting in conference and the destinies of the outer planets were passing from the hands of those who had planned the raid against the Moon.

Down on Earth the statesmen of the mother world faced reality at last. They had seen the Wilson drive in action and knew that the day of the rocket was

gone. They also realized that although they had—at tremendous cost—won the first round the greater science of the Federation must prevail in the end. Peace and the Wilson drive were worth all the uranium in the universe. A message was already on its way to Mars with the news that Earth was willing to reopen negotiations.

It was well for humanity that the battle ended as it had. The *Acheron* would never fight again and no one could tell that any building made by man had ever stood in the Sea of Rains. Both sides had exhausted themselves.

Had Jamieson refused to continue his journey to the fortress complete victory might have gone to the Federation. Flushed with success, it might have been tempted to further adventures and the Treaty of Phoebus would never have been signed. Upon such small decisions may world destinies depend.

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For hours, it seemed to Wheeler, they had been trudging across this seared and shattered plain, the brilliant Earthlight casting their shadows ahead of them. They spoke seldom, wishing to conserve the batteries of their suit radios. The curvature of the Moon made it impossible to signal the Observatory and there were still fifty miles to go.

It was not a pleasant prospect, for they had been able to salvage nothing from the tractor—it was now a pile of fused metal. But at least they could not lose their way with the Earth hanging fixed in the sky to guide them. They had only to keep walking into their shadows and in due course the Alps would come up over the horizon.

Wheeler was plodding along behind his friend, lost in his own thoughts, when Jamieson suddenly changed his direction of march. Slightly to the left a low ridge had appeared. When they reached it they found themselves climbing a hill not more than fifty feet high.

They looked eagerly to the north, but there was still no sign of the Alps. Jamieson switched on his radio.

"They can't be far below the horizon," he said. "I'm going to risk it."

"Risk what?"

"Emergency transmission. You can key these sets for two minutes at fifty times normal power. Here goes."

Very carefully, he broke the seal on the little control board inside the suit, and sent out the three dots, three dashes and three dots which were all that was left of the old Morse code.

Then they waited, staring toward the featureless skyline of the north. Below its edge, beyond sight and perhaps beyond signaling, lay safety. But the Observatory gave no sign.

Five minutes later Jamieson signaled again. This time he did not wait. "Come on," he said. "We'd better start walking again." Wheeler followed glumly.

They were halfway down the slope when a golden flare climbed into the northern sky and erupted slowly against the stars. The sense of relief was so great that Wheeler was left weak.

He sat down clumsily on the nearest boulder and stared at that beautiful, heart-warming symbol hanging in the sky. Even now, he knew, the rescue tractors would be racing down the slope of the mountains.

He turned to his friend. "Well, Sid, that's that, thank God."

For a moment Jamieson did not reply. He too was staring up toward the stars—but along the path the retreating warship had followed hours before. "I wish I could be sure," he murmured half to himself, "that I did the right thing. They might have won . . ."

Then he turned toward the blinding disc of Earth, breathtakingly lovely beneath its belts of clouds. The future might belong to the Federation but almost all that it possessed it had inherited from the mother world. How could one choose between the two?

He shrugged his shoulders—there was nothing he could do about it now. Resolutely he turned toward the north and walked forward to receive the fame from which he would never escape.