A STREET & SMITH PUBLICATION

ASTOUNDING STORIES

NOVEMBER

20¢

NRA CODE

THE MOLE PIRATE

by

MURRAY LEINSTER

THE GREAT THIRST

BY

NAT SCHACHNER

—

E. E. SMITH, Ph.D.

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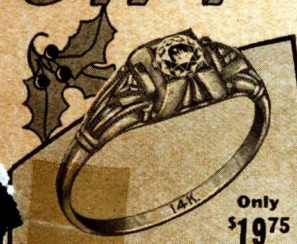

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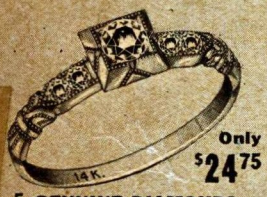

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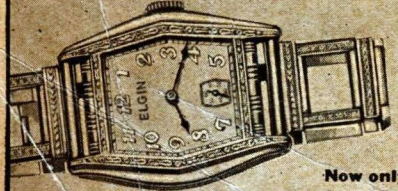

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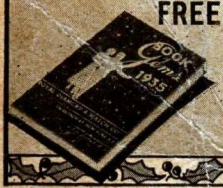

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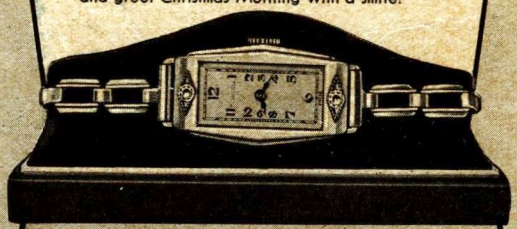

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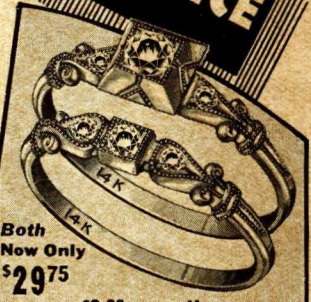

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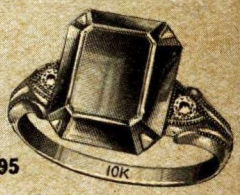

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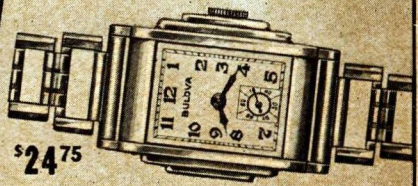

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VOLUME XIV
NUMBER 3

ASTOUNDING STORIES

NOVEMBER
1934

A STREET & SMITH PUBLICATION

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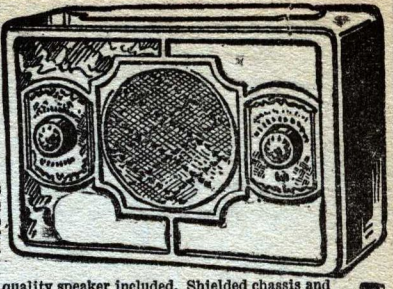

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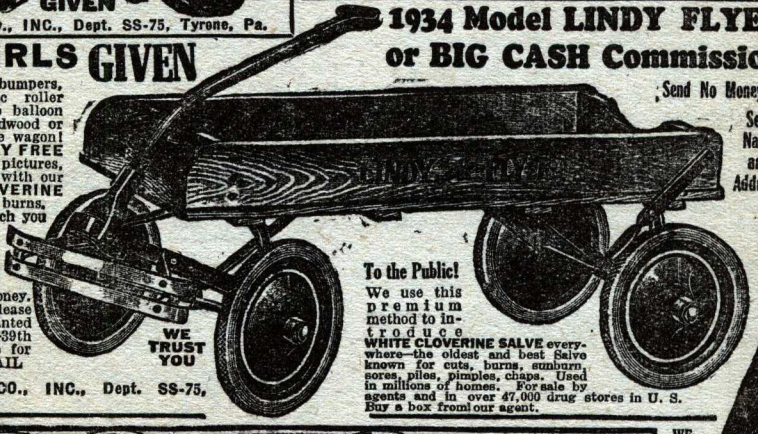

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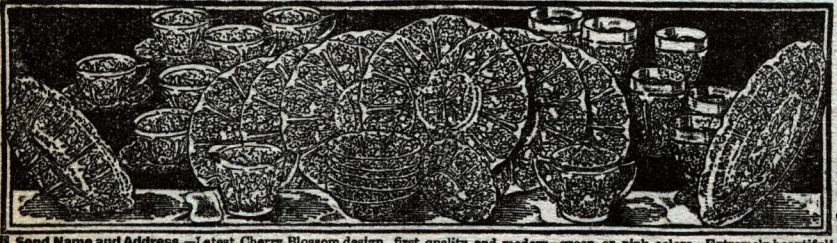

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29x4.75-20	2.50	.95	
29x5.00-19	2.85	1.05	
30x5.00-20	2.89	1.05	
28x5.25-18	2.90	1.15	
29x5.25-19	2.95	1.15	
30x5.25-20	2.95	1.15	
31x5.25-21	3.25	1.15	
28x5.50-18	3.35	1.15	
29x5.50-19	3.35	1.15	
30x6.00-19	3.40	1.15	
31x6.00-19	3.40	1.15	
32x6.00-20	3.45	1.25	
33x6.00-21	3.65	1.25	
32x6.50-20	3.75	1.35	

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32x4	2.95	.85
33x4	2.95	.85
34x4	3.25	.85
32x4½	3.35	1.15
33x4½	3.45	1.15
34x4½	3.45	1.15
30x5	3.65	1.35
33x5	3.75	1.45
35x5	3.95	1.55

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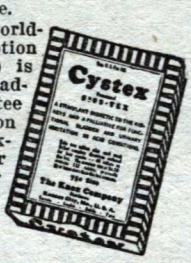
Nearly everyone is likely to suffer from poorly functioning Kidneys at times because modern foods and drinks, weather changes, exposure, colds, nervous strain, worry and over-work often place an extra heavy load on the Kidneys.

But when your Kidneys need help, don't take chances with drastic or irritating drugs. Be careful. If poorly functioning Kidneys or Bladder make you suffer from Getting Up Nights, Leg Pains, Nervousness, Stiffness, Burning, Smarting, Itching Acidity, Rheumatic Pains, Lumbago, Loss of Vitality, Dark Circles under the eyes, or Dizziness, don't waste a minute. Try the Doctor's prescription Cystex (pronounced Siss-tex). See for yourself the amazing quickness with which it soothes, tones and cleans raw, sore irritated membranes.

Cystex is a remarkably successful prescription for poorly functioning Kidneys and Bladder. It is helping millions of sufferers, and many say that in just a day or so it helped them sleep like a baby, brought new strength and energy, eased rheumatic pains and stiffness—made them feel years younger. Cystex starts circulating through the system in 15 minutes, helping the Kidneys in their work of cleaning out the blood and removing poisonous acids and wastes in the system. It does its work quickly and positively but does not contain any dopes, narcotics or habit-forming drugs. The formula is in every package.



Because of its amazing and almost world-wide success, the Doctor's Prescription known as Cystex, (pronounced Siss-tex) is offered to sufferers of poor Kidney and Bladder functions under the fair-play guarantee to fix you up to your complete satisfaction or money back on return of empty package. It's only 3c a dose. Ask your druggist for Cystex today and see for yourself how much younger, stronger and better you can feel by simply cleaning out your Kidneys. Cystex must do the work or cost you nothing.

City Health Doctor Praises Cystex

Dr. W. R. GEORGE

Doctors and druggists everywhere approve of the prescription Cystex because of its splendid ingredients and quick action. For instance, Dr. W. R. George, graduate Medical Dept., University of Indiana, former Health Commissioner of Indianapolis, and Medical Director for insurance company 10 years, recently wrote the following letter:

"There is little question but what properly functioning Kidney and Bladder organs are vital to the health. Insufficient Kidney excretions are the cause of much needless suffering with aching back, weakness, painful joints and rheumatic pains, headaches and a general run-down, exhausted body. This condition also interferes with normal rest at night by causing the sufferer to rise frequently for relief, and results in painful excretion, itching, smarting and burning. I am of the opinion that Cystex definitely corrects frequent causes (poor kidney functions) of such conditions and I have actually prescribed in my own practice for many years past the same ingredients contained in your formula. Cystex not only exerts a splendid influence in flushing poisons from the urinary tract, but also has an antiseptic action and assists in freeing the blood of retained toxins. Believing as I do that so meritorious a product deserves the endorsement of the Medical Profession, I am happy indeed to lend my name and photograph for your use in advertising Cystex." Signed W. R. George, M. D.

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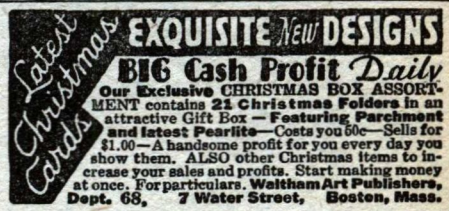

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If Your Letters——!

If the increasing number of letters to Astounding means anything in the way of a growing reader-audience, we are on the way toward fulfilling the next step in our program.

Of course it will take several months to check up and feel sure, but it is promising.

I am unable to print all the letters—or half of them! I can't even get one third of them into the column, despite our increasing the number of pages and reducing the type in Brass Tacks.

Your great response makes me glad, but I'm wondering if we shouldn't put a word limit on the letters, so as to include more. Let me know what you think about that when you write, will you? It seems unfair to leave out three short letters to include one long one, yet sometimes the long letters are very interesting. Then, too, classifying the stories for interest takes a lot of space. Possibly we could just talk of the most interesting ones and mention those we dislike.

John W. Campbell Jr.'s great serial, The Mightiest Machine, starts next month. You will find it just as fascinating as any story we have published and it brings another favorite into the Astounding group.

We are being swamped with good stories now. I could easily fill two magazines each month without letting down on quality. That would give us space for twice as many readers' letters, too!

We are giving you seven complete stories every month and two serials. I can't help calling it to your attention, because—well, we're moving ahead solidly and sanely and being honest in our efforts to give you the finest magazine ever offered in the field of super-science. It is only natural, I suppose, for our until recently complacent rivals to be alarmed.

Shall we keep driving together until we can safely take the step? We are approaching the point slowly. Let's keep the progress steady.

I can assure you that we still have vast unreached fields which our stories can explore. We can keep the magazine fascinating and go twice a month. It would give you fourteen complete stories each month. It would wind up a six-part serial in three months and answer your objections to that unavoidable division of a 90,000-word story.

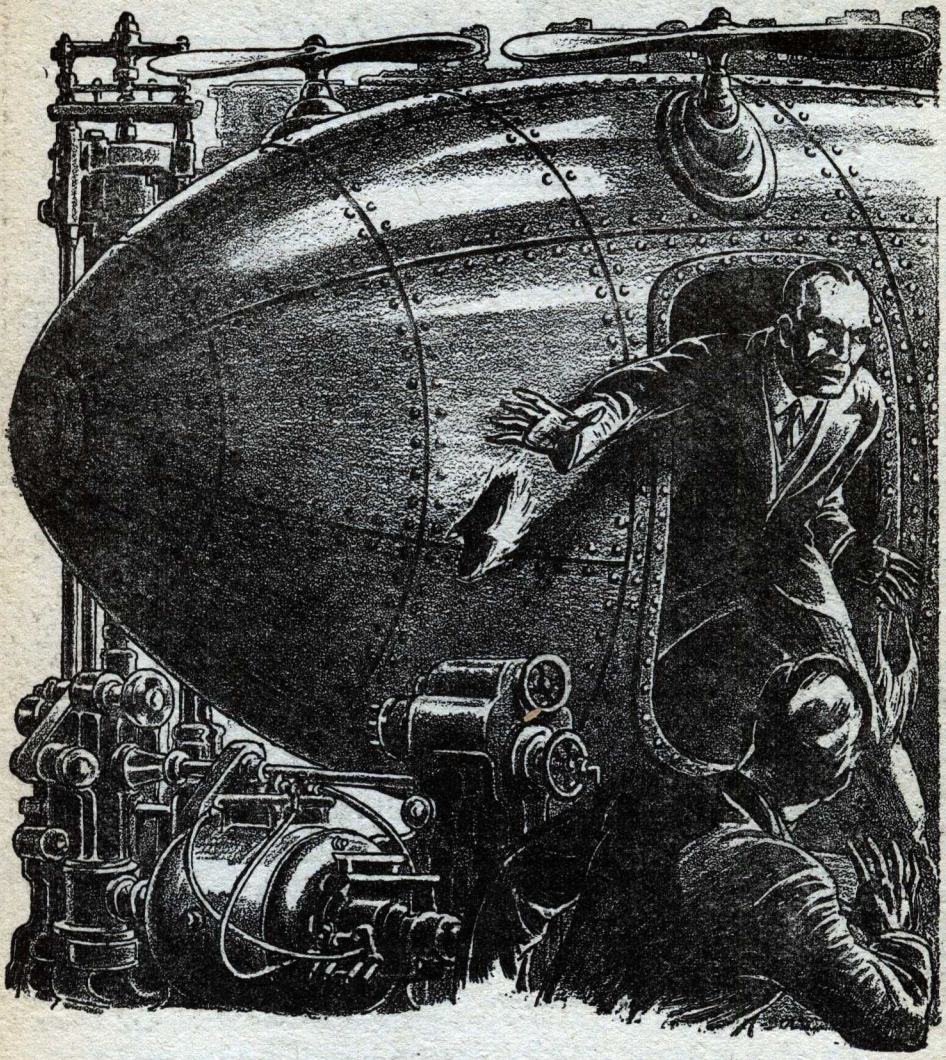
I appreciate deeply the whole-hearted coöperation you have shown in finding new readers. If that coöperation proves to have been 100%, or even 75%, nothing can stop us. If you have forgotten it, find a new buyer for Astounding now. If we all do it our road is clear.

Remember, Astounding is not like an ordinary magazine. It has a very special audience, with special interests. We have things in common which make the editor and readers almost a family circle. And to accomplish our joint purposes, we must coöperate.

The only way we can expand our circle is by introducing our friends to the appeal which we know exists in our magazine.

Thank you, again, for the splendid volume of letters we're receiving. And never fear that we do not weigh every suggestion carefully, for we consider every one of you a member of our growing "family circle."

——The Editor.

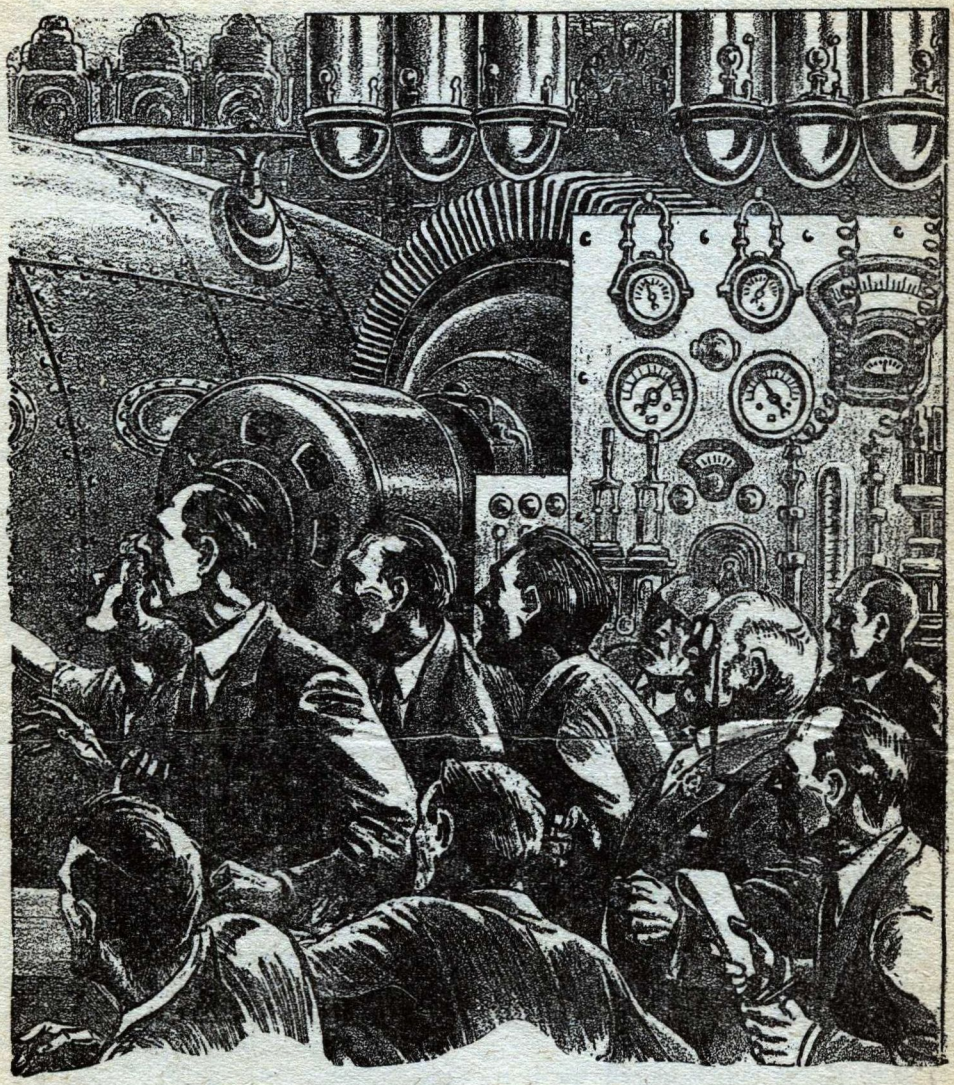


The Mole Pirate

It came over the crowd like a shock—this wasn't the great scientist at all. This was—the greatest criminal alive!

by Murray Leinster

Illustrated by Elliot Dold



THE STORY of the Mole Pirate properly begins neither with Jack Hill, who built the *Mole,* nor with Durran, who stole it and used it to acquire more loot and do more damage than any other pirate ever managed in an equal length of time.

The records begin with a Mrs. Frank P. Hohenstaufer, who appears only once in the entire affair, and with Professor Eisenstein who, whatever his prominence in history, vanishes with equal promptness from this tale.

Really, the career of Durran as the Mole Pirate was simply one long battle between himself, the scientist-criminal, and Jack Hill, the inventor we remember as the man who made the earth-plane possible. But the story does begin with Mrs. Hohenstaufer, however briefly she remains in it.

She was, it seems, washing dinner dishes on the screened-in back porch of her home in Wausakkee, New York. It was three o'clock in the afternoon of June 16, 1935. The sun was hot. The

radio in the dining room droned through a news bulletin, amid sundry cracklings of summer static:

Police have found a hide-out they feel sure was used by James Durran, America's Public Enemy No. 1, for at least two weeks. Durran, formerly one of America's greatest scientists, has been living in the most squalid surroundings, amid great privation, since he made his cynical statement of his intention to renounce all ideas of morality and ethics for the so-called natural principle of living for one's own satisfaction only.

Durran's record to date shows that in six months he has been the cause of eight deaths —two believed to be murders committed by him personally—and twelve robberies. His loot has totaled more than a hundred thousand dollars, but he lives in conditions of unbelievable squalidness.

Four members of his gang, recently captured, have been sentenced to life imprisonment and are now in Sing Sing prison——"

Mrs. Frank P. Hohenstaufer dried dishes and meditated piously. It was good that the government required the broadcasters to emphasize the penalties dealt out to lawbreakers and not to talk about criminals until they were caught or nearly caught. It would make young men more law-abiding.

She looked complacently through the screening. The Albany highway soared past, not half a mile from her door. As she looked, a car slowed down and turned off to the county road. It disappeared from view behind a clump of trees.

Mrs. Hohenstaufer looked for it to reappear with a sensation of mild curiosity. But it did not. It remained hidden. For three, four, five minutes there was no sign of it. Then it showed again, sweeping back up onto the highway. Into low speed, racing in second —dodging two heavy trucks bound for Troy—and then into high, the car shot forward at its maximum speed until it became a dwindling speck in the distance.

Mrs. Hohenstaufer blinked. That was her clump of trees. These people, these tourists, had no respect for other people's property. Maybe they came to steal green stuff for a city apartment; maybe some of the tiny pines and cedars that city people were making a fad of just now.

Indignantly, Mrs. Hohenstaufer took off her apron. She marched the full half mile to the wood lot in the broiling sun, growing more indignant as she marched. She saw the tire tracks of the car. It had crushed ruthlessly through the tender small growths which Mrs. Hohenstaufer expected to sell at the proper time for transplanting. She followed the tracks, growing more angry by the minute.

Then she saw a man lying on the ground. His sandy-brown whiskers and white hair looked vaguely familiar to her even at first glance, but then she grew horrified. He was bound hand and foot. He was quite unconscious, and blood flowed from a nasty blackjack wound on his temple. Mrs. Hohenstaufer squawked in dismay.

IT WAS half an hour before the police came. In that time Mrs. Hohenstaufer had cut the ropes from about the man's body. She had carried him, herself, all the way back to the house. There she telephoned for the police and a doctor and regarded her patient with extreme disfavor. He was undoubtedly one of these criminals of whom the radio chattered constantly.

She greeted the police with indignant protests against their allowing criminals to clutter up the wood lots of law-abiding people with their victims and acquaintances.

Then the officers saw her patient.

"Good Heaven!" said the first. "It's Professor Eisenstein! What the hell's happened to him?"

"Prof——" Mrs. Hohenstaufer squeaked. "The scientist? The great scientist that all the papers print pictures of?"

"That's who," said the cop. "Here! We got to get him fixed up so he can tell us——"

The patient's eyes opened vaguely. His whiskers stirred. "Durran," said the injured man faintly, "Durran, you *verdammt* fool, what is der idea?"

Then he looked bewildered.

The cops snapped phrases of explanation.

"An' you were talkin' about Durran," said one of the two feverishly. "Did he sock you, professor?"

"To be sure." The white-haired man blinked and said angrily: "I came out of my house and got in my car. I had an appointment to visit der American Electric laboratories, where Jack Hill is going to show off a most remarkable infention to-day. And halfway there, my chauffeur turned around, and he was not my chauffeur. He was Durran, whom I knew. And he hit me with a blackjack. I suppose he has stolen my car."

"Right!" snapped the cop. "Brady, you got it? Phone in an' give the alarm. Durran's in Professor Eisenstein's car, an' it's a blue Diessel, license number is——"

The other cop snapped into the telephone. Plugs clicked. A smoothly running organization moved swiftly into action. Short radio waves carried a brisk, curt order into every police car in New York, and to police-car headquarters in at least two adjoining States. In fifteen minutes, by actual timing, there were more than two hundred police cars, at least a hundred traffic posts, and even a few stray members of the general public feverishly on the lookout for Professor Eisenstein's blue Diessel, because it contained America's Public Enemy No. 1.

And all that effort and all that searching was in vain. Because the blue Diessel was parked outside the American Electric laboratories, where Professor Eisenstein had an appointment, and nobody thought of noticing it.

It was not until Professor Eisenstein's secretary was notified of his whereabouts and telephoned an apologetic message to the laboratory that the blue Diessel was noticed. The professor and Mrs. Hohenstaufer immediately vanished from the tale of the Mole Pirate. But in the meantime things had happened.

II.

JACK HILL was talking to reporters in the machine-shop section of the American Electric laboratories. The lathes and machine tools were covered over, for the moment, and there were a dozen or more of folding chairs in view. On a table before Jack there was a large sheet of white-painted metal, on which stood a block of brass and a small but intricate contrivance of radio tubes and the like. Behind him a wide curtain hid the farther wall.

"I'll give you a part of the idea now," said Jack. "Professor Eisenstein is late, but I don't want to start the apparatus until he gets here."

"What's all this performance about, anyway?" demanded a man from the *Mirror*. "Somebody said you had some kind of gadget that made you able to walk through walls."

"I'd hate to tell you what I can do," returned Jack. "You wouldn't believe me. I'd rather show you. I've been experimenting on a rather neglected aspect of the atom. You know, of course, that the atom is regarded to-day as a sort of miniature solar system, a nucleus like a sun with a greater or lesser number of electrons revolving around it like planets?"

"Yeah." The *Mirror* man had appointed himself spokesman. "We know all that stuff."

"Good!" said Jack. "Then we can talk about magnets first. In ordinary

iron the molecules have north and south poles, like all other molecules, but they point in every possible direction, helter-skelter. They have magnetism in them, but it isn't organized. Pointing haphazard, though each one is a miniature magnet, in the mass they neutralize each other. It's only when the whole mass of iron is magnetized that all the poles point in the same direction—or only when they all point in the same direction that it's magnetized. Is that clear, too?"

"Yeah! I hadda do an interview with Eisenstein once," said the *Mirror* man. "He said I had a brain for that stuff."

"Kind of him," observed Jack. "Now I've been trying to carry the idea of organization a bit further. Not only molecules but atoms have poles, and they point helter-skelter in every direction, too. Suppose I got them all to point in one direction. What would happen then?"

"You could walk through walls?" hazarded the *Mirror* man.

Jack grinned. "Not so fast! Let's think it over first. An atom is a miniature solar system. That means it's practically flat. But with such flatnesses pointing in every direction—well, an enlarged picture of any sort of matter would be just about like a dozen packs of cards being poured from one basket to another and back again. They'd be fluttering every which way. You couldn't swing a stick through those falling cards without hitting a lot of them."

"Not unless you were pretty good," conceded the *Mirror* man.

"But if you had the same number of cards falling, only in a neat and orderly fashion, every one parallel, so they'd stack up all face down in the bottom basket—— It's a standard card trick to spring a pack of cards from one hand to the other like that. You could swing a stick through that bunch."

"You might knock one of 'em away," said the *Mirror* man cautiously, "but you wouldn't mess up the whole works. They wouldn't block up the whole distance between the baskets."

"Just so!" said Jack approvingly. "Professor Eisenstein was right. You do have a head for this stuff. Now the object of my experiments has been to arrange the atoms in a solid object like the second bunch of cards. They're flat. And it turns out that when they're arranged that way, all parallel, they block so small a proportion of the space they ordinarily close up, that they will pass right through ordinary matter with only the slightest of resistance. And that resistance comes from just such accidental collisions as you suggested."

THERE WAS a stirring at the door. The snow-white hair and bushy, sandy whiskers of Professor Eisenstein came into the room. He beamed at Jack and the reporters. He spoke separately to Gail Kennedy, bending over her hand. The girl looked at him queerly. She was here because she intended to marry Jack and wanted to share in this triumph.

Her father and half the higher-ups of American Electric came in after the professor. Gail's face stiffened when her father's eyes fell upon her. He did not approve of Jack.

"*Ach,* my young friend!" said Professor Eisenstein blandly.

A flash bulb flared as he shook hands with Jack. A news photographer changed plates in his camera and abstractly envisioned the caption. It would be "Eisenstein Congratulates Youthful American Scientist," if this demonstration came out all right, and "Eisenstein Condoles" if it didn't.

"You go on with your explanation," said Eisenstein cordially. "I sit at your feet and listen. Presently I make an announcement which will surprise eferybody."

He sat down benignly. Gail looked

at him, at her father, and back at Eisenstein. A moment later she appeared to be puzzled and uneasy. Her eyes remained fixed on Eisenstein.

"I had just explained to these gentlemen," said Jack, "the object of my experimenting, the coördination of atom poles and what might be expected to result. I think all of you are familiar with the reasoning, since there's been a good deal of controversy about it. It was suggested that any coördinated matter would collapse into something like neutronium. Fortunately, it doesn't."

He flung a switch and vacuum tubes glowed. A curious, ghostly light appeared above the white-painted sheet of metal on the table.

"The field of force," he explained, "which arranges the atoms in any substance so that they all point the same way."

He switched off the tubes. The light died. He picked up the block of brass that was on the table. He placed it where the light had been.

"I'm going to coördinate all the atom poles in this piece of brass," he observed. "Around the shop, here, the men say that a thing treated in this way is dematerialized. Watch!"

He flung the switch again and as the eerie white light flared on, the solid mass of brass seemed to glow of itself. Its surfaces ceased to reflect a brazen color. They emitted the ghostly hue of the field light. Then it seemed that the block glowed within. The light seemed to come from inside the block as well as from its outer edge.

The whole thing took place in only the part of a second. A swift, smooth, soundless glowing of the block, which began at the outside and seemed to move inward—and cease. Then there was nothing visible at all but the queer glow itself.

Jack turned off the field. The light vanished. But the metal block did not spring back into view. Instead of a solid cube of polished brass there was the tenuous, misty outline of a cube. It looked unsubstantial, fragile. It looked like the ghost of a block of metal.

"It's still there," said Jack, "but you're looking past the edges of the atoms, so it's very nearly transparent. It's just as solid, in its way, as it ever was. It weighs as much. It conducts electricity just as well. But it's in a state that isn't usual in nature, just as magnetism isn't usual. The poles of its atoms all point the same way. Now look!"

He swept his hand through the misty block. He lighted a match and held it in the middle of the phantom. It burned, where Jack had claimed there was solid brass. A skeptical silence hung among the reporters.

Then the *Mirror* man said: "That's a good trick, but if it wasn't phony——"

"What?"

"If that brass was still there, an' it would pass through anything else, it'd slide right through that sheet metal an' drop through the floor!"

"Radio-activity," said Jack. "The only exception. When coördinated matter is bombarded by radio-active particles, some of the atoms are knocked halfway back to normal. This paint has thorium oxide in it and it's slightly radio-active. Come here a moment."

The *Mirror* man went skeptically forward. He suddenly reached out and passed his hands though the phantom block.

"It's a phony!" he said firmly. "You're tryin' to put somethin' over on us!"

"Put on these gloves," said Jack. "They've been painted with more of the same radio-active paint."

The *Mirror* man incredulously obeyed. He reached again for the phantom block. And he gasped. Because his hands, incased in these gloves, touched something which was not only solid, but heavy. He picked it up, held

it high, and his face was a study in stupefaction and unwilling belief. He staggered over to the nearest of his confrères.

"By cripes!" he said dazedly. "It is real, even if you can't see it! Put y'hands on it!"

The other reporter, who was seated at the table, put his hands right through the object he could very dimly see. And to the *Mirror* man the brass block was solid. It was heavy. He gasped again and his hold relaxed. The phantom slipped from his fingers.

"Look out!"

THE MAN gasped for the third time as the phantom object dropped. And it looked so utterly unsubstantial that the eye denied its weight. It should have floated down like gossamer, or so it seemed. But it did fall with the forthrightness of something very heavy indeed.

The man who had just put his hands through it now instinctively held them out to catch it. He cupped them, in anticipation of something very fragile and light. The phantom struck his hands. It went through them, and he could not feel it. It reached his knees and penetrated them. It dropped to the floor and through it, and did not as much as stir the cloth of the seated man's trousers.

"That's gone," said Jack dryly, "though I intended to reverse the process and bring it back to normal. It's falling down toward the center of the earth, now, encountering just about as much resistance from earth and stone as if it was falling through air. I don't think any of us are likely to see it again."

Professor Eisenstein beamed. The *Mirror* man put his head in his hands. The other reporters babbled together. Gail Kennedy looked frequently and uneasily at Professor Eisenstein. A telephone rang stridently somewhere. Somebody answered it, out of sight.

"Have I gone nuts?" the *Mirror* man exclaimed.

"I don't think so," Jack assured him. "If you have, all the rest of us will be nuts, too, in just a moment. Because what I've showed you is just a preparation for this."

He turned and pushed aside a curtain. It took nearly a minute to clear the thing behind it, because the curtain hid a space all of forty feet long, and most of that space was filled with an altogether-extraordinary object.

While Jack thrust at the curtain a distant voice said, evidently into a telephone: "Professor Eisenstein's secretary? Yes, the prof——"

Noise cut out the rest of it. Gail Kennedy looked puzzledly at Professor Eisenstein. He was abruptly alert and feral. He was listening. His eyes, which had been benign, became quite otherwise. And Gail Kennedy suddenly looked as if she could not believe a thought which had come to her and which she could not dismiss. She stared at Professor Eisenstein in something approaching horror.

Jack turned again to his audience. He had cleared the *Mole* to view. It was a vessel of riveted steel plates quite ten yards in length and about three yards high. There was a rough approximation to torpedo shape, but the likeness was not carried far enough to keep it from looking more like a military tank than anything else.

Yet even that wasn't a fair description. There were neither tractor treads nor wheels. Instead, there was a marine screw propeller in the back and four others mounted vertically where wheels should have been. They made the *Mole* into something it was quite impossible to classify.

It was plainly designed for travel, but in what medium was not clear. It did not seem fitted for travel in any medium

at all. Yet the heavy glass windows and a carefully curved and fitted door which opened inward seemed to imply that the medium was one in which a supply of air for breathing would need to be carried along.

"Here's the ship," said Jack curtly. "In it the field of force I just generated is made use of. There's a generator of that field inside the ship, also a means of alternating the gradually weakening field to restore it to its normal condition. The process is the same as demagnetization.

"I go inside the ship. I start the motors, and these screws try to revolve. They can't. I turn on the force field and the ship becomes like that block of brass. It tries to drop down to the center of the earth as that block of brass did. But the screws revolve, then. And they are coated with a film of radioactive matter somewhat thinner than the paint on this sheet of metal. It's not radio-active enough to keep them 'solid.' It's just enough so that they seem to work in a medium about like—like——"

"Mashed potatoes," put in Professor Eisenstein unexpectedly. "Much better than water for der screws to work in."

"Just so," agreed Jack. "And now, to save a lot of talk, I'll show you how it works."

He opened the curved door.

Professor Eisenstein got up and said blandly: "May I come? I haff der most implicit confidence."

Jack stared. Then he said gratefully: "Thanks! Of course you can come." To the others he added: "I'll put the ship through the same process as the block of brass, only I'll rematerialize it. Please don't stand where I'm going to bring it back. The results would be very unpleasant."

He ushered the white-haired scientist into the door. Gail Kennedy stood up and opened her mouth, her features queerly twisted. But before she could speak Jack was inside the *Mole* and the door had closed behind him.

There was a queer roaring noise out-of-doors. It sounded like the popping of many motor cycles. But those in the machine shop of the American Electric Co. paid no heed. They were giving strict and exclusive attention to the ungainly metal shape before them.

Something rumbled inside it. The screws stirred. Then a ghostly, eerie light seemed to envelop it. And in the fraction of a second the solid mass of metal shimmered into insubstantiality. It was transparent—more transparent than any glass. Only its outline could be seen, ghostly and improbable.

The screws, for an instant, seemed somehow more solid than the rest. They swept swiftly into motion, into a blur which was like the most airy of froth. The whole ship settled with a speed which suggested falling, until those screws took hold—in the solid concrete of the floor.

IT WAS a phantom, then, which remained steady for an instant. Then the tail propeller began to revolve. And slowly, slowly, the apparition, the ghost, the utterly unreal outline, began to move. The tail propeller swept through the concrete of the floor. The whole thing moved forward with a quick gathering of speed which was exactly like a ship getting under way. It reached the wall. It went through it. And not one brick, not one grain of mortar, was disturbed.

Stunned silence. Then a startled babbling.

A new photographer wailed: "I didn't flash it! I didn't flash it!"

And then there was a sudden rush of figures at the doors—dark, blue-clad figures with service revolvers out and ready.

"Where's the man who calls himself Professor Eisenstein?" barked a police

lieutenant, staring around. "We want him!"

The president of American Electric, no less, stood up indignantly. "What's all this about?" he demanded furiously. "What the devil——"

"Durran!" snapped the cop. "He knocked Professor Eisenstein on the head an hour ago. Stole his car. One of your men here said Professor Eisenstein was right in here. That must be Durran himself! Where is he?"

Then Gail Kennedy gave a little choked cry. And as she uttered the cry the shimmering, ghostly outline of the *Mole* rose up through the floor. Somebody leaped to be away from it. It went to the end of the room and out through the wall beyond. And again there was not a brick or a grain of mortar disturbed.

"He's—in that!" said Gail, her throat constricted. "With Jack! Hide! You policemen! Hide, quickly!"

And for long minutes there was incoherent argument with the police before the ghostly *Mole* appeared again. Its pointed beak came through the wall to the right. It was a wraith. It was unreal. It was not substance, as we know substance. It came, slowing as it came, and checked itself by a reversal of its tail propeller. It was still, a hair-raising spectacle to the policemen who had not been prepared for such a sight.

And suddenly an eerie light seemed to envelop it and fade, and its substance thickened and thickened. Its vertical screws, revolving freely in the concrete, found resistance to their movement. They climbed upward, lifting the whole *Mole*.

And then, as the eerie light grew very faint and died, the *Mole* became actually solid. It became real, and it was a massive construction of riveted steel plates, unlike anything else that had ever existed on earth. Its solidity came as a shock. The clang of its door as it opened broke a silence of almost superstitious intensity.

Jack Hill came out. "As you see," he said quietly, "it works."

Gail darted forward to him, clutching him convulsively. "Jack!" she gasped. "Professor Eisenstein! He's Durran! I thought he'd kill you and take the *Mole*——"

Then a bland voice came from the open door of the earth-ship. "In that case, I can drop both my accent and my whiskers."

The man who had been taken for Eisenstein tugged at his face. The identifying sandy whiskers came off. He flung away the white wig. He grinned at the men in the machine shop.

"As Professor Eisenstein," he said amusedly, "I promised an announcement that would surprise everybody; I make it now. I'm Durran."

A pistol barked savagely. He jerked backward and almost closed the door. Through the remaining crack he said more amusedly still:

"I add that my mission here to-day was much more successful than I expected. I hoped to gain useful information. I've got something much better, this contrivance and instructions in its use gained on a trial trip. Au 'voir!"

The door slammed. Almost instantly a fusillade of shots poured upon the machine. But the eerie white light enveloped it. It shimmered into a phantom which fell with a jerk. Then the vertical screws caught it again and raised it back into view. It did not come all the way above the surface of the ground, now. Only half its bulk appeared above the surface. Only the tip of the phantom tail screw appeared above the concrete in which it suddenly began to revolve with a quite impossible freedom. It moved forward—through the wall. It vanished.

"And I showed him all about the

thing!" said Jack Hill. "I even let him steer it!"

There were policemen outside the laboratory. Durran was America's Public Enemy No. 1. When a force of uniformed men swarmed inside the laboratory, another force took position outside, to surround him in case he evaded the others momentarily. These men outside saw what looked like the ghost of a prehistoric monster swimming across solid ground toward them. Superstitious terror afflicted some. Others did not believe their eyes. But a hoarse and raging voice from the laboratory shouted for them to shoot it.

They did. Their bullets went through it without affecting it in the least. It was not substance of a sort that bullets could harm. But as if they were annoying, like pin pricks, the phantom dived. It sank out of sight in the solid earth underfoot, still moving forward. Some of the policemen thought they could feel a slight vibration, as if of engines underground.

III.

DURRAN vanished in and with the *Mole* at something after four o'clock. At five, a motorist drove shakenly to the home of his family physician. His nerves were badly frayed.

He had seen something like a turtle, he said, swimming in the solid earth. It was larger than his car, and it swam across a concrete road, in the concrete, directly before him. It was a ghost, and there were no ghosts. His nerves were upset, and he wanted treatment which would keep him from seeing anything like that again.

At five thirty, a motorist stopped at a filling station for gas and heard screams coming from inside it. The proprietor was dead on the floor, shot. A colored helper was having hysterics beside his body.

The helper told what ought to have been a wholly improbable story of a monstrous engine which appeared out of thin air, from which a man emerged and shot the filling-station proprietor. He then took gas and lubricating oil, got back inside the monstrous thing of steel plates, and it melted into thin air again and its ghost swam away.

These two stories were accidents. Durran's real intentions began to be outlined later on—at eight o'clock, to be exact.

At that time—eight o'clock, p. m. Eastern Daylight Saving Time of June 16th—there were extra editions of practically all newspapers on the streets, screaming in headlines of Durran's latest exploit. "Durran Steals Mystery Invention." "Durran Escapes Under Fire." "Durran Scores On Cops Again." "Scientist-Criminal Turns Phantom."

But on the whole, the theft of the *Mole* was played down. The story of what the *Mole* could do was too improbable to go in a news story. It was held over for the Sunday editions, when feature writers could take space to expound it—if it was still true.

Most of the papers did not really believe in the *Mole,* despite the impassioned assertions of the reporters who had been on the spot. And in a thousand police stations the official report of Durran's latest exploit and the contrivance he now had at his disposal were subjects for argument. Mostly, the report was regarded with extreme skepticism.

More than one inquiry came to the originating office of that report, demanding confirmation. And more than one hard-headed police official did not bother to inquire, but indignantly reported that a hoax was being put over by somebody. The New York State police—and half of them, even, did not quite believe it—were spending as much effort trying to get the facts accepted as they were in trying to devise some

method of coping with the menace the *Mole* now represented.

But none of this uncertainty and none of this indignation was to be found in the Wedgewood Arsenal, in Connecticut. Durran simply wasn't thought of there. It was a semi-Federal, semi-State, arsenal which did not manufacture arms. It was a storage place with a stout captain of regulars assigned to duty in it, and a small detail of soldiers who served practically as watchmen. It was an emergency depot of weapons and ammunition, and the duty of its official caretaker was mainly that of making out documents in triplicate for some purpose unknown.

In that arsenal, at eight p. m., there was peace. The captain in charge was seated at a desk in a corner of the vast hall which had once been used for indoor close-order drill by a National Guard organization. He was making out a document in triplicate. His pen scratched. He smoked languidly on a fat cigar. From time to time he mopped his forehead, because it was hot.

There was utter quietness, utter peace. It was so still that it seemed even the scratching of the captain's pen aroused murmurous echoes. The captain sighed heavily. His chair squeaked. That did arouse echoes, which rang about the huge hall for seconds before they died away reluctantly.

Then there was another sound—the very ghost of a sound. Something impalpable and tenuous rose out of the floor. First a round snout, which was quite transparent. After it a misshapen huge bulk, all of thirty feet long.

The whole thing was unsubstantial, was unreal. It came to a stop in the middle of the vast open space. It flared brightly and the glare against the walls made the captain start. He whirled in his chair. Then his eyes widened. His mouth dropped open.

The light was fading, and as it faded the ghost in the middle of the ex-armory grew solid. Noises came from it, which became louder and more real. Then the light died away completely and there was a huge thing of entirely substantial steel plates at rest. Huge steel screws beneath it turned for a space, and wooden planks splintered and cracked. Then all was still.

DAZEDLY, blankly, like an automaton, the army captain got up and walked stiffly toward the thing that had appeared before him. Perhaps he had some wild thought of visitors from another world or another dimension. As a curved steel door clanked open he went rigid. But the figure which stepped out was a man, a tall man with a merciless sort of amusement on his face. He brought up a pistol. He fired it, quite ruthlessly and quite coolly.

The explosion echoed thunderously. It made a drum roll of sound as the echoes played about between the walls and among the rafters. The captain choked and made absurd motions with his hands. He collapsed on the floor.

Then the man from the solidified phantom set to work, very coolly and very swiftly.

When a corporal of the guard detail came in anxiously some few minutes later, he saw a shimmering something sinking through the floor. He thought it was an optical illusion. It made his hair stand on end for an instant, but he forgot it when he saw his commanding officer lying dead on the floor.

He, and the other men of the guard, and later on the local police, too, found no sign of any way by which an assassin could have got into the arsenal. They found the captain stretched on the floor with a bullet in his heart and an expression of blank amazement on his face.

They found a case of loaded hand grenades gone, several light machine guns missing, with drums of ammunition for them, and an assortment of tear

gas and a few lethal gas bombs. Also a certain amount of engineers' stores had been taken, notably blocks of compressed guncotton intended to be used for demolition purposes.

IV.

SING SING prison is forty miles from the Wedgewood Arsenal, and the *Mole* turned up there at eleven o'clock. Its speed was greater than that performance would indicate, however, and it is probable that Durran stopped somewhere to rest and possibly to investigate the *Mole's* various mechanisms more thoroughly.

It is clear that he had made his plans in detail between four in the afternoon, when he stole the *Mole,* and eight at night when he raided the arsenal. To carry out his plans he needed help, and he knew where to get it, and he had to move fast to avoid being outguessed and having his men hidden away from him.

It was a bright, moonlit night. At eleven o'clock the high concrete walls of the prison glowed palely where the moonlight struck them and showed utterly black in shadow. White arc lights glittered within the prison inclosure, making a misty white aura above the walls. The cell blocks of course were dark, save where corridors reached to windows and showed the faint illumination within. The lights of Ossining twinkled in the distance, and a river steamer floated upstream out in the middle of the Hudson River.

A guard, pacing the top of the wall, saw a vaguely moving thing outside. It was too dark for him to see it clearly, but he watched curiously. Something was moving, past question, but the suspicion of Sing Sing guards is directed always toward the interior, not the outside, of the prison.

The guard could make out only motion. Its line was clear. The guard fixed his eyes upon a whitish stone on the ground and waited for it to be obscured. The moving thing, whatever it was, went smoothly up to that stone. The guard watched.

But the movement continued and it was past the whitish stone, and the stone was not hidden for even an instant. The guard grew doubtful and even more curious. The inexplicable thing was headed straight for the base of the wall. He saw or felt it reach a spot directly below him. Movement continued. Then there wasn't anything there at all. He called to the guard next him.

"Somethin' funny," he said uneasily. "I saw somethin' movin', down on the ground, an' then it wasn't there."

The other guard looked down, but on the inside of the wall, because it is toward the inside that a prison guard bends all his alertness. He searched with his eyes.

"There it is!"

He pointed. From the height of the wall and in the glare of the bright arc lights a misty, phantomlike shape could be seen. But it could be looked through. The floor of the exercise yard was visible below it.

"What the hell!" said the second guard.

"Y'guess we oughta make a report? It looks like a ghost!"

The second guard continued to stare. The phantom swam smoothly across the open space. It reached the outer wall of a cell block. It vanished, apparently into that wall.

"Gosh!" said the second guard. "That was a funny thing!"

"What was it? A ghost?"

"Hell, no!" said the second guard, without conviction. "It was some mist, maybe. A speck of fog or somethin'. Y'want to be kidded to death?"

The first guard did not want to be kidded to death. He returned to his pacing back and forth.

QUIETNESS again. A steamer out of sight on the river hooted dismally. Somewhere a motor car hummed along a distant road. Insects stridulated insistently. The crunch of feet on concrete. The wailing, plaintive cry of some night bird. One minute, two, five, ten minutes, with only such sounds as guards upon a tall concrete wall will normally hear.

Then a single, muted *"pop"* in a cell block. A small sound, but distinctive. Every guard in every watching post heard it and gripped his rifle more tightly. Every man turned to face the sound. Silence. Another muted *"pop."* Then the sudden, snarling roar of a machine gun, unmistakable even though it came from a cell block.

An instant later, there was the shattering concussion of a hand grenade. Glass in the cell block broke out and went tinkling down the stone sides of the building. A neat row of windows gaped glassless into the night. Then a man screamed, a high, shrill scream that was not less horrible from being distant. Another shattering explosion. Yet another.

Guards raced for the building. Then pandemonium broke loose. The guards on the wall stayed there. It was their job to check a break, if one came, on the outer defenses. But they saw running men with rifles make for the cell block. They heard shouts, yells, howlings of terror and of exultation alike. The cell building became a madhouse.

And then a series of detonations began which were thunderous in intensity and deliberate in spacing, suggesting an inhumanly cold-blooded destructiveness at work. After each explosion came screams.

Then the men on the wall saw a phantom come out of the cell building. It was feet above the level of the exercise yard. It was unsubstantial and unreal. It was the wraith of a nightmare.

Shimmering, ghostly, impossible, it careened out of the wall and toppled to the ground. It seemed to bury itself—if a ghost can bury itself—before it came slowly into view again.

Not one shot was fired at it. It was impossible. It was a figment of the imagination. It simply could not be.

The phantom swam across the exercise yard of Sing Sing prison. It moved steadily toward the massive, monstrous outer wall of the prison. It reached that wall. It went into it. It vanished.

The guard who first had sensed movement outside now looked down again, shivering a little. He would not have known what the phantom of the *Mole* was, even if he could have seen it clearly.

But he saw nothing. He did sense that something was moving down on the ground below him, but that was all. A vague stirring moved soundlessly away from the prison walls and vanished into darkness. He did not shoot at it because he saw nothing to shoot at.

That was his story after the whole disturbance was ended, and he stuck to it. He wasn't believed, of course. There were four prisoners missing, twenty or thirty injured by explosions, three guards dead and others hurt, and nearly one floor of the northeast cell block so badly wrecked as practically to be destroyed. A guard who said he saw something moving, but nothing to shoot at, was not telling a plausible story. Four men, escaping, should have made a magnificent target in the arc-lighted exercise yard.

It was not until the next day that a reasonable two was put to an incredible two and an inevitable four was arrived at. The missing prisoners were pals of Durran's. The phantom seen by the guards, the explosives, the destruction told——

Taken with the raid on the Wedgewood Arsenal, the uproar at Sing Sing made it perfectly clear that Durran, in

the *Mole,* was a criminal with an unparalleled opportunity to gratify his every impulse. And it seemed likely that he intended to use his opportunity.

V.

FOR THE NEXT three days there was no word of Durran or the *Mole* or any of the four men he had raided Sing Sing to release.

Something had been pieced together of what he did, of course. On the 17th, a radio store in Newburgh, New York, was looted of practically all its material for radio repairs, wire, tubes, sockets, transformers, batteries—everything that goes into the making of a radio receiver was stolen. That same night, too, fancy groceries in considerable quantity were taken from the town's most expensive food shop.

Next day, on the 18th, police surveillance of the women formerly beloved by the released prisoners came to an abrupt end. The women vanished. From sheer habit the police instituted the customary search to find out who had taken them away from their usual haunts. They discovered nothing.

It is reasonable to assume that the first two thefts, of radio parts and food, were preparatory moves by Durran. The removal of the women was a part of the process of making the released prisoners contented.

Meanwhile Durran seems to have used all his intelligence in the examination of the *Mole,* and on the 19th he was probably busy. Certainly on the 20th he was prepared for action on a larger scale than before.

At nine thirty that night a thunderous, clanging uproar broke out in Newburgh. The outdoor alarm gong of the First National Bank went off with a tremendous noise. Simultaneously, the local police station received due warning of prowlers at work inside the bank. It was not a large bank, but even the little ones have more than one burglar-alarm system installed nowadays.

In less than five minutes from the sounding of the alarm, a patrolload of cops was on hand, prepared to do battle with bank robbers. The bank doors were closed and locked. They were opened from inside by a scared and bewildered watchman. He had heard the gongs, too. His own telltale registered a disturbance. But he could find no sign of anything wrong.

Then bank officials tore up in a motor car. A third alarm system had reported disturbance to the home of the cashier. They crowded into the bank, to be faced by puzzled cops and nearly deafened by the insistent, frantic clanging of the alarm gong outside.

Somebody managed to turn off the gong. It looked as if a freak accident had set off every protective device at once. The cops were rather sheepish, standing embattled in the bank with absolutely nothing to do. But there could be nothing wrong.

The vault was closed and locked and obviously untouched. There were no thieves to rout, it seemed, so the question became that of discovering and correcting the flaw in all the protective devices. The bank suddenly gleamed light everywhere. A master switch turned on every light in the place.

Then they saw the *Mole.* It was quite stationary. It was a huge, shimmering phantom, its bow end lost in the metal of the vault. Its tail, also, vanished into the side wall of the bank building. Standing still as it was, it could be examined with some detail, and presently it was observed that the four huge, vertical screws turned lazily, maintaining its position in spite of the gravity pull which tried to drag it down to the center of the earth.

Men shot at it. The bullets went harmlessly through. They hacked at it with fire axes from a case on the wall. The blows spent themselves on seem-

ingly empty air. The men drew back, regarding the earth-ship helplessly. Then a minor official of the bank, desperately daring, plunged first his hand and then his whole body into the phantom.

He could feel no resistance to his movements. The *Mole* remained as transparent and as unsubstantial as before. But, from within, he could see wraiths about him—machinery like gossamer, even men, like ghosts.

One of those ghosts saw him and pointed at him. Another ghost rocked back and forth, laughing, and the bank clerk was tormented by the suspicion that he heard a whispering thread of that Homeric laughter. Then one of the ghosts made an elaborate, mocking gesture of lifting a phantom cap in greeting.

A roar of rage brought the clerk out of the phantom. Somebody had thought to put his ear to the vault. And there was movement within. Through the steel walls came thumpings, crashings, bumps. There were men at work within the monstrous sealed safe—methodical bangings, deliberate, purposeful thuds and clanks.

"They're looting it!" panted the president of the bank, purple with rage. "Looting it! And the time lock's on, and we can't get in!"

Something like a dozen armed policemen and half a dozen bank officials stood helplessly by, hearing the sounds from within the vault. They went on for half an hour. Then the *Mole* backed comfortably out of the vault wall, a ghost in being, went through the side wall of the bank, and swam off into the utter unreachability of its peculiar state of existence.

When the time locks permitted the vault to be opened, the worst fears of the bank's officers were realized. The contents of the vault had been leisurely sorted over. Currency, negotiable bonds, the contents of the safe-deposit boxes—everything was gone. And the furnishings of the vault were wreckage.

THEY WENT to Jack Hill next morning and found him haggard from four days and nights of work to cope with the catastrophe whose ultimate possibilities he foresaw. He was in the machine-shop section of the American Electric laboratories again.

Gail Kennedy was with him, trying to persuade him to stop and rest. The visitors were an impressive lot. Police officials, banking potentates, and representatives of liability-insurance companies. They regarded Jack with profound hostility.

"Mr. Hill," said an eminent banker, in a voice that quivered with indignation, "I suppose you realize what you have done?"

"Thoroughly!"

"Now, what are you going to do about it? Every bank in the country is at the mercy of this Durran, through the hellish contrivance you made. No man's property is safe."

"Rather more important," observed Jack, "no man's life is safe, either, if Durran wants to kill him."

"But how can this menace, this pirate, be handled?" Again the eminent banker spoke. As if of old habit, his voice took on an oratorical intonation. "When the arsenals of our government furnish him with explosives, our prisons with men, and the devil with ideas——"

"Oh, it's bad," said Jack. "It's very bad. But I'm working now to stop it. I'd like to know if he's changed the *Mole* about any, though. What's he done?"

They told him about the Newburgh robbery—more than fifty thousand dollars in currency gone, the contents of the safe-deposit boxes——"

"That doesn't help me!" insisted Jack. "The *Mole* is pretty big. As I built it, that robbery would have been impos-

sible. It couldn't be materialized inside a bank vault. There'd be no room."

So far they'd told him only the results of the robbery. Now they told him the details of their helplessness while it went on.

Jack nodded in satisfaction. "I see! He's improved the ship. But for those screws you saw revolve, the *Mole* would drop straight through the earth to its center, as a block of brass did here. And, of course, if a man stepped out of the *Mole* while it was dematerialized, he'd drop too, without some device to hold him up."

There were protests that men had been heard at work inside the vault.

"I know," agreed Jack. "But they weren't phantoms! Durran has fitted up an extra force-field apparatus. He can materialize a part of the *Mole* without materializing the whole. He drove the ship so its bow stuck out into clear space inside the vault. Then he materialized that part, and that part only.

"There were a couple of men in it. They got out, gathered up their loot, and stored it in that part of the ship, and then Durran dematerialized that part again so that it was like the rest of the ship. And then he swam away."

"But what can we do to stop this—this ghastly performance?" demanded the banker agitatedly. "He can rob any bank in the country! He can steal any treasure, any security, any record!"

"You can hide your treasures," replied Jack meditatively. "Until he starts kidnaping people and forcing them to tell where valuables are, he'll be stopped. And—well—the screws of the ship are coated with a thin film of thorium alloy. That is partly real in both states of existence. You can make bullets and bombs of radio-active substances. Anything that's radio-active will find the *Mole* substantial. You can puncture it with radio-active bullets or shatter it with bomb fragments, if they happen to be radio-active, too."

"You suggest," said the banker in almost hysterical indignation, "that we shoot Durran with radium bullets? Think of the cost!"

"It's more important to think of results, just now," said Jack dryly. "But thorium will do instead of radium, and that isn't too expensive to use in gas mantles. It'll be cheap enough.

"I have, though, one really comforting thing to tell you. The *Mole* was built for underground exploration, to find veins of mineral and for geological study generally. It isn't designed for the use to which Durran is putting it.

"And the entire resources of American Electric are now put into the building of a new *Mole* which will be designed for offensive warfare underground. As soon as our new ship is complete—and it should not be long, working as we are—we'll find the original *Mole* and destroy it."

Gail Kennedy said something to him in a low tone.

Jack nodded wearily. "Something to keep Durran from materializing his ship even in part? Why, yes! My head's tired, Gail. I should have thought of that."

He turned to the others. "I have one promising suggestion, due to Miss Kennedy. I've proved that two solid bodies can occupy the same space at the same time. But they can't, in the same state. If there is any matter more solid than air where the *Mole* materializes, the sudden appearance of extra material in the same space will cause an explosion. So you can stack bars of iron, and grilles, and string wires inside your vaults. Make it impossible for any part of the *Mole* big enough to hold a man and loot to materialize without including some such extra matter. If Durran tries, he'll blow up the *Mole!* It's worth trying, anyhow."

He passed his hand wearily over his forehead when the indignation party

went out of the laboratory. Gail smiled anxiously up at him.

"I was stupid," said Jack tiredly. "I guess you're right, Gail. The new ship is taking form very nicely. The others can carry on without me. And my head's so tired I'll do better work if I rest."

JACK took a last look at the partly completed ship that was to take the place of the *Mole,* in the very spot where the *Mole* had been. There was a great deal yet to be done to this new ship, but to Jack it already looked promising. He saw past the incomplete framing, the only partly assembled machinery. He visualized the streamlined vessel of the new design, more heavily powered than the *Mole.*

Its sustaining screws worked on swivels and at full speed would not only sustain but help to propel it. And there was armament. A two-pounder gun with a spotter searchlight. When this ship was dematerialized, it would fire shells that would be utterly unsubstantial to anything but the *Mole* or radioactive minerals.

The spotter searchlight would emit extraordinarily polarized light, capable of penetrating stone and rock in the state of matter Jack had discovered. This ship should have no trouble overtaking and destroying the *Mole.*

"Funny," said Jack suddenly. "I never thought of it before. This ship's going to be fast. And we could build faster ones yet. Planes, in fact. Earth-planes! They'd carry passengers. No storms. No wind-currents. Earth-plane ports in the center of our biggest cities. Climb in an earth-plane and fly through the earth's core, beneath or through mountains and oceans. And they'd be fast!"

Gail smiled at him. "Good! You think about that instead of Durran for a while. But I'm going to take you home and make you go to sleep."

She did take him home. She made him promise to rest at once. But, tired as he was, this new vision of a medium in which the commerce of the world would be carried on in the future, kept him awake for a long time.

IT SEEMED that Jack had just dropped off to sleep when the strident ringing of a telephone beside his bed got him heavily awake. He glanced at a clock. It was after midnight—one o'clock. He picked up the phone.

"Hello?"

"Mr. Hill!" panted a voice at the other end of the wire. "This's the gate watchman at the lab. There's all hell loose inside! Explosions! I sent for the cops, but it sounds like Durran's back! Listen!"

Over the wire came dull concussions. Then the extraordinarily distinct sound of running feet, a slamming door. A voice panted, and Jack caught the message before the watchman repeated it:

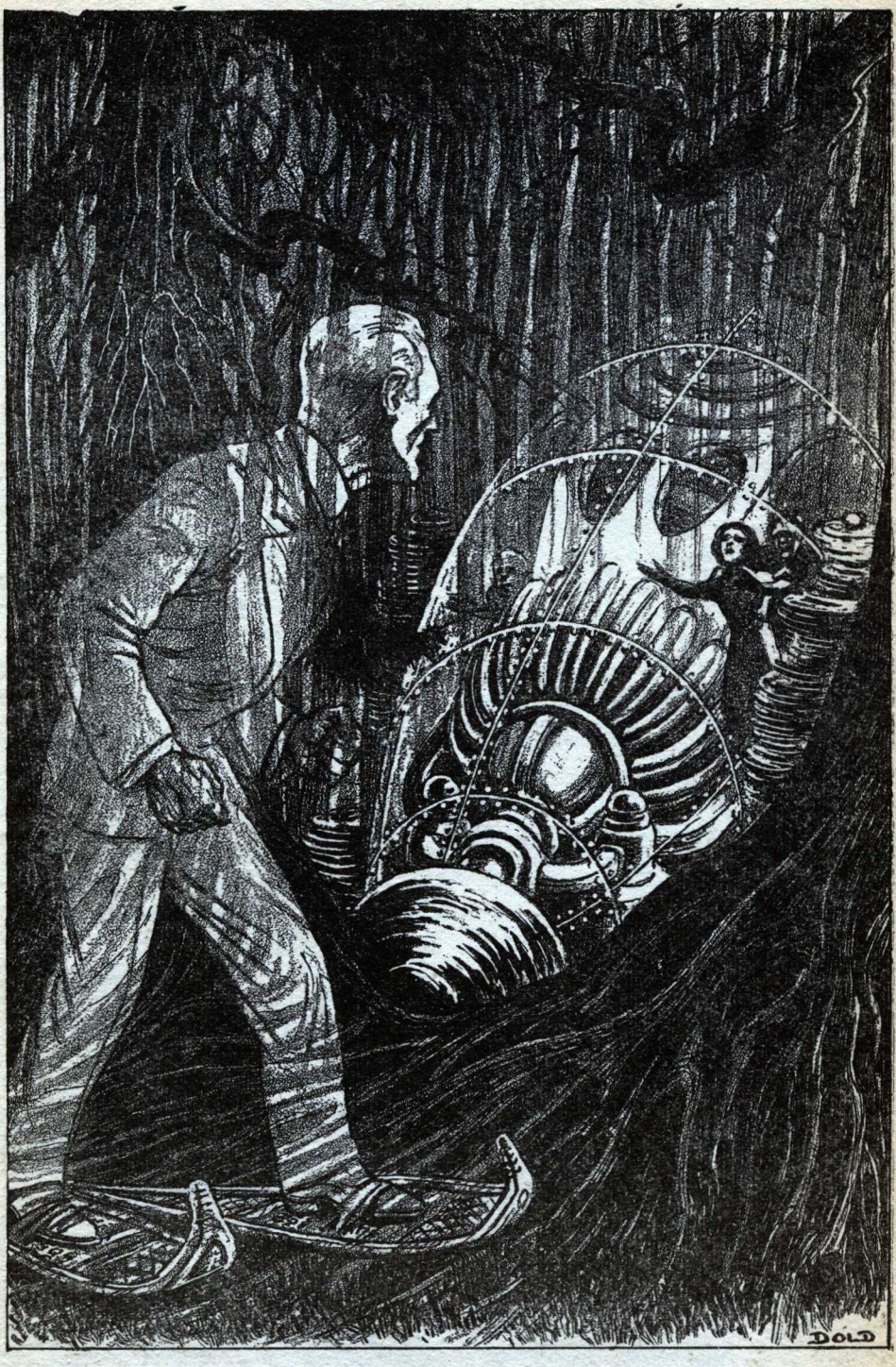
"The *Mole's* in there an' Durran is flinging bombs outta a tube in front. They turn to real as they come out. He's blown the new *Mole* to hell an' he's smashin' the lab!"

A terrific detonation seemed almost to smash the telephone instrument at the other end of the wire.

VI.

IT WAS stupidity, of course, that caused the destruction of the American Electric experimental laboratories. Durran made a thorough job of it. It seems that he stopped at a construction job in Schenectady and looted the powder house of explosives to have plenty for his purpose. And it is quite certain how he came to know of the need to blow up the laboratory.

Within an hour after Jack had reassured the committee of bankers and police officials, the newspapers had the whole story. To Jack the need of se-



The Mole *swam away. He was alone—as no man had ever been alone before. He walked upon vapor, and around him were only ghosts.*

crecy was so self-evident that he had not thought of mentioning it. But to a banker the self-evident necessity was to reassure the public so there would be no runs on banks.

To police officials the self-evident necessity was to make a public statement meaning that they had a clue and an arrest would follow shortly. To the newspapers and the broadcasters there was no thought of anything but hot news, to be passed on at once.

In consequence, Jack's assurance and his description of a ship being built to hunt down and destroy the *Mole* was given to the whole world. And with the world it went to Durran, too.

He acted immediately. He destroyed the laboratory where the Nemesis of the *Mole* was preparing. And he did more. When Jack got to the scene of the disaster, fire roared among the ruins. The new ship was scrap iron. And plans, apparatus, formulas, everything the laboratories had contained, were gone.

Gail ran up to him as he surveyed the wreckage. "I'm so sorry, Jack!"

"It is pretty," returned Jack sardonically. "Those damned fools had to tip Durran to everything! And he'll be on the lookout now. My guess is that he'll try to bump me off, because with everything in the lab in flames, I'm the only one with all the stuff in my head to make another *Mole* possible. We've got to start building another one in secrecy. Better, half a dozen of them. He won't be able to destroy all of them before one's finished."

Gail's father came up, scowling. "This costs American Electric better than a million," he said bitterly.

"I'll give it back to you," said Jack harshly. "Listen to me!"

Swiftly, tersely, he talked of a new transportation system which would be faster and safer than any the world had ever known before, and wholly independent of weather or storms.

"And if that doesn't make up for the damage," he added savagely, "here's another: We dig shafts for mines, now. We send men down underground. But Durran's found a way to materialize a part of the *Mole* while leaving the rest a phantom. If he can do that, so can we, and the other way about, too.

"Why can't we lower a tank with a field of force in it? Dematerialize it and lower it through rock and stone to an ore bed as deep as we want to go—ten miles if necessary? Then turn on the field of force to dematerialize the ore that's inside that tank.

"The ore, being made phantom to the rest of the world, will be actual to the tank. And we can haul tank and ore up to the surface as easily as they'd drop to the center of the earth. Once above ground we rematerialize both."

Kennedy stared. Then his eyes flared triumphantly. "That does it! You win, Jack! No matter how much damage Durran does, that one trick pays for it and more besides."

Then Gail Kennedy screamed. A ghostly something—eerie and unbelievable in the red firelight—moved toward them.

"The *Mole!*"

In one instant Jack had Gail up in his arms. He sprinted—toward the *Mole*. He had seen a curious ring of solidity, upheld in mid-air, silhouetted against the blazing laboratory. And that would be the tube he'd heard about, through which bombs were dropped to become "real" as they emerged.

Jack plunged past that bomb tube and the ghostly *Mole*. Once past, Durran would have to turn the earth-ship to bring the tube to bear, and that would take time. In a straightaway pursuit it could run him down on foot. But now it——

A hand grenade went off behind him. Earth spattered him. Something stung his leg, numbing it. Warm stuff flowed down it. Then he was at a car. He flung Gail inside, jammed on the starter,

and jerked it into first. The phantom of the *Mole* was turning. It came toward him again. And he shot away at forty-five miles an hour which became fifty and then sixty as he got onto a clear straight road.

"Your father," said Jack coolly, as he pushed the car to a higher speed yet, "may think I'm a coward. But Durran has destroyed nearly or quite every record of how the *Mole* was built. I'm the only man who can build another force-field generator without those destroyed drawings and figures. I simply have to save that knowledge until I can get it down on paper."

Then Gail said in a rather choked voice: "I'm—wondering about my father."

For answer, Jack swung right, left, right again. He drew to a stop before a drug store. He called the gate watchman at the laboratory from the phone booth. In seconds, Gail was talking to her father.

"He says you did the right thing," she reported an instant later. "Durran did intend to get you. But—my father thinks that if he saw that you picked me up, he may think that the best way to handle you is to be able to threaten me. So I'm forbidden to go home. Dad's going to get a fast car and meet us. He's going to send me away. You, too, most likely. You're important."

Jack grunted. "Where do we meet your father?" he demanded.

When she told him, he swung the car and headed that way.

THEY WERE three hundred miles away by dawn, and Jack flung himself headlong into the tedious, exacting work of drafting new plans from memory, building a new force-field generator also from memory, and of necessity for its construction determining all over again the constants needed for the calculation of certain of its parts.

He barely took time to eat and sleep, but in seven days he was ready to install new force-field generators as fast as they could be built in the new and faster earth-ships already taking shape in a dozen widely separated machine shops.

Three of those days were taken up by the need to repeat work already done, the results of which had been destroyed with the American Electric laboratory.

During that week, however, Durran progressed from the status of front-page news to a point where he was practically all the news there was. For one day after the American Electric fire, there was no report of his activity anywhere.

No authentic report, that is. A hysterical public reported the presence of the *Mole* from something like one hundred and fifty different points within a three-hundred-mile radius of its last appearance, and declared Durran busy at crimes ranging from the setting of forest fires and wholesale kidnapings to the robbery of a chicken coop in East Orange, New Jersey.

Actually, Durran was still trying to reach and kill Jack Hill, as his solitary dangerous opponent. He had materialized a part of the *Mole* in the cellar of the house next to Jack's home. He hoped that Jack would return to his home, if only momentarily, to secure personal possessions or records. With the *Mole* part phantom and part real in the cellar of the house next door, his followers seized and bound and gagged the occupants of that house and watched comfortably for Jack's return.

He did not appear, though Durran waited for him for twelve hours. At the end of that time he took on board the men who had been watching, dematerialized the *Mole,* and moved away. But he left an incendiary bomb under Jack's house, and the firemen who vainly fought the blaze it started discovered the helplessness and the sufferings of the people next door.

Then the *Mole* began its career—the

part for which it is remembered, at any rate. At dawn it was sighted in Troy, crawling deliberately out of a national-bank building. A policeman shot at it and blew his whistle frantically. It swam indifferently for two blocks along the trolley tracks of Troy's main street.

While twenty police made frantic, helpless gestures, it crawled into another bank. It remained there for half an hour, its blunt nose thrust through the solid metal of a vault and its sustaining screws turning lazily. Then it sank abruptly into the ground. Its exit from town was unobserved. Both banks were looted.

At nine o'clock the Merchants' National Bank in Albany was open for business. There were a few more than the normal number of customers inside. The *Mole* swam through the walls and came into view. A stenographer saw it and screamed. There was a sudden glow of eerie whitish light at its snout.

A round ring of solid matter appeared, incredibly floating in mid-air at the forefront of a monster which seemed made of the most tenuous of fog. Something hard and round and quite solid dribbled out of that ring. It fell to the floor and exploded into a blinding haze of tear gas. More flares of eerie whitish light. More solidity appeared. Men got out and worked swiftly.

Police charged in from the street and were met by machine-gun fire. A hand grenade followed. The list of dead and injured was horrifying. Presently the *Mole* swam deliberately out into the street. It passed through a trolley car, in which women fainted. It turned into the town's greatest jewelry store. Another tear-gas bomb. Ten minutes, and it came out again. Crowds swarmed about the scene of excitement. The *Mole* insolently moved upon and through the helpless police.

And in Albany Durran or one of his men committed a wholly causeless atrocity. A hand grenade dropped from the solidifying ring where the crowd was thickest. There was no reason or excuse for it. The hospitals of Albany were crowded with injured, alike those directly mangled by the grenade and in the panic which followed its explosion.

The *Mole* went on, insolently and deliberately looting bank after bank before the eyes of the police. There was no defense against it. Treasure locked in the bank vaults was but made more convenient for Durran's men. Left elsewhere, they drove out or blinded would-be defenders with tear-gas and machine-gun fire, with hand grenades always in reserve.

The Mole stayed two hours and a half in Albany. Its loot was something over three quarters of a million dollars.

It reached Poughkeepsie at dusk. But here it was expected. A radium-paint concern supplied the police with radio-active material. Daubed on bullets, the paint did all that Jack Hill had promised. A storm of paint-smeared lead poured upon the misty monster at its first sighting. Direct hits, instead of going harmlessly through a phantom, seemed to encounter resistance. Some punctured the nearly invisible steel plates when fired at sufficiently close range. Glancing hits—glanced. Several police were injured by ricochets.

THE *MOLE* dived at the first sign of injury. In seconds its shimmering, unreal rounded back was sinking into the pavement, which stopped what bullets seemed to penetrate rather than pass harmlessly through its impalpable armor. Rather quaintly, too, the painted bullets seemed likely to be effective in an unexpected way.

Once having punctured the *Mole's* hull, it was of course as difficult for them to get out as to get in. And they were "real" in both the actual world and the strange universe of the *Mole*. They caught at once in the pavement

and the hull and prevented the *Mole* from sinking out of sight. For minutes, the *Mole* seemed to be held fast. Then a terrific explosion underground flung up the street. A second, a third.

Otherwise unable to escape, Durran had materialized high-explosives in the solid earth and set them off. He blasted away the roadway in which the bullets were caught. They undoubtedly remained inside the hull, but when no longer held fast by real matter, they could be gathered up and thrown outside one of the *Mole's* phantom ports. The *Mole* went on, still underground.

For a time, despite the terrific losses from those blasts, the police of Poughkeepsie were almost jubilant. Remembering Jack Hill's statement that violent explosions would come of the materialization of one solid body inside of another, it was thought that the explosions came from some such occurrence.

But they were undeceived. A quarter of a mile away, the earth heaved up. Further, it heaved up again. Durran took a terrible revenge for the attempt at resistance. When he left Poughkeepsie the shattered ruins behind him were a guarantee that no other city would ever attempt the use of radio-active bullets against the *Mole*. The casualty list in Poughkeepsie was six times as large as that in Albany. It shocked the world.

Next day, the *Mole* made no foray. And it was a strange fact that since the complete ruthlessness of the earth-ship's crew had been demonstrated, fewer hysterical reports of its presence were made. At first, perhaps, those who fancied they saw it made haste to tell the police in hopes of its capture. Now, they simply fled. But there is no verified report of any activity on Durran's part the day after the Poughkeepsie tragedy.

The day after, it struck Peekskill and Yonkers. It was plainly heading for New York and such an orgy of looting as no five men in the world had ever before engaged in. Another day of peace.

Then it invaded Brooklyn by way of Harlem, evidently passing under the East River in its progress. A night and day of wholesale looting, with the police standing helplessly by and as their only effort at defense preventing crowds from gathering where they could be slaughtered.

That was an ironic touch; that the police were so far from being able to counter Durran's criminal actions that the utmost they could do was prevent him from being annoyed while engaged in robbery.

New York was still untouched. And then, after a day and a night of looting in Brooklyn, the motorman of a rush-hour Brooklyn subway express, slowing to a block signal in a tube under the river, saw the phantom, impossible apparition of the *Mole* lying across the tunnel. The only solid thing about it was that materializing tube Durran had invented and installed.

The motorman jammed on the air brakes and the cars behind him filled with noise as the standing passengers piled up in heaps. Then something came out of the round ring of solidity held upright by the phantom *Mole*. Something which looked white and flat, with a long ribbon attached to it. A light glowed in the materializing ring and shone down upon the dropped object. It was an envelope, a letter.

A guard, his teeth chattering, climbed out of the front door and picked it up. It was addressed to the mayor of Greater New York. Shivering, he climbed back into the subway train.

The *Mole* stirred. The motorman and those crowded to the front windows of the train could see through it, beyond it. A round thing dribbled out of the materializing tube and fell between the rails. Then there was a little flare of eerie light and the materializing tube

vanished. The *Mole* swam serenely away through the solid walls of the tunnel. It was lost in the unexplored solidity beneath the bed of the river.

Then the round thing on the track flashed up. Tear gas filled all the tunnel. But the subway train had to go forward. It could not go back. Filled with blinded, hysterical passengers, it pulled into the first station on the Brooklyn side and its motorman made a ragged stop, judging only by the glare that a station was at hand.

The newspapers published extras, after that. The letter was a bland communication from Durran. He was holding New York to ransom. He would smash the subways and bridges, blast down the tall buildings by planting explosives at their bases, and wreck the water and power supply of the city if his terms were not met. And his terms were staggering. He gave the city forty-eight hours in which to agree to them. And as if to give point to his threat, within an hour an alarm came from the Brooklyn Navy Yard. The *Mole* was there. When it left, it had seized enough high explosives to blast down half of New York.

It was not especially comforting to receive a reassuring broadcast from the American Electric Co. saying that a full dozen earth-ships, each faster, more powerful, and more heavily armed than the original *Mole,* would be completed in ten days more. In that ten days, Durran would have ruined the city.

VII.

OF COURSE they sent for Jack Hill. In the governor's mansion at Albany he met with the mayor of New York City, the governor of the State, and an array of financial and industrial magnates who would have been impressive if they had not been so thoroughly panic-stricken.

Gail Kennedy was there, too. She'd insisted on coming back with Jack, and she and her father—now backing Jack strongly—provided moral support for him in the atmosphere of embittered hatred that filled the meeting.

"This is your fault!" said the mayor of New York furiously. "The American Electric Co. financed the highly unwise experiments which have led to this grave menace to our commonwealth, but you built the piratical craft which now holds——"

Jack interrupted gently: "You're talking nonsense. It may be good politics, but it's poor policy. Do you want to know what you ought to do?"

"That is what we have come here for. How are we going to avoid meeting these impossible terms Durran imposes on our city?"

"Don't," said Jack dryly. "Pay him. You'll get it back."

"How?"

"He can store only so much in the *Mole,*" replied Jack more dryly still. "Even bank notes and bullion. As a matter of fact, bullion costs him money to carry around. My guess is that he's cached most of his loot, already. And my further guess is that the sweethearts of his four men have a pretty good idea where that cache is. When Durran and his men are killed—as they will be—those four women will spend some of it before they're caught, but not particularly much. Meanwhile, we gain time until the new earth-ships are finished."

"But—millions and millions——" gasped a prominent banker.

"I have a suggestion to make," said Jack gently, "about the payment of that money. I will not make it in this mob" —even in such an emergency a rustle of indignation, a bristling, passed about the assembly—"because I told an equally eminent group, some days ago, about a ship under construction to destroy the *Mole.* With really superlative fatheadedness, they told the world and

consequently Durran. That ship was promptly blown up. So since you gentlemen can't be trusted to hold your tongues, I'll keep my own counsel until you've decided to meet Durran's terms. Then I'll communicate a suggestion to the person in charge of that payment. Not before!"

His idea was, of course, that bullion and even paper money could be so impregnated with radio-active material that when once taken on board the *Mole* it could not be moved through solidity and would expose the *Mole* to attack. A duplication, on a larger scale, of the incident of the radio-active bullets in Poughkeepsie.

"I might even," Jack added sardonically, "say that it's very possible that Durran knows where this meeting is taking place. If he does, and can make it here in time, we may be in a bad fix, anyhow, you and I and all of us."

He swept his eyes about the gathering. Some of the faces looked frightened, some looked indignant, but none looked guilty. Jack felt reassured, which was a mistake. He did not realize that the sort of man who blabs a secret never feels guilty for having blabbed it. He feels only frightened, sometimes, for fear that it may be found out he has blabbed.

And Jack did not quite realize how many men have their price. Bribery is of no service in scientific research, and Jack's mind simply did not work in a fashion to understand it either as a method or a temptation.

"But do you realize that we're at the mercy of a pirate?" wailed a prominent Wall Street banker. "Every cent——"

"With the warning you've had," Jack broke in, "I rather suspect you've shipped most of your valuables out of the city. At a guess, Durran's been in a couple of bank vaults and found them practically empty. Hence this holdup."

"Of course!" snapped the mayor of New York. "Most of the cash in New York has been shipped out. Most of the particularly valuable jewels, too. Even nine tenths of the art treasures have gone!"

"Then there's nothing to be done——"

There was an indescribable noise outside—a strangled squawk, as if somebody saw something utterly terrifying. A lesser politician turned a ghastly white. Then something came through the door. The door was closed, but the Thing came through it. And suddenly whitish light flared, and a round ring appeared in mid-air.

The gathering of eminent figures in finance and politics became a howling, panic-stricken mob. A rush of fear-crazed men bowled Jack over. He struck out savagely and was on his feet again as something flashed from the floor.

JACK fought ruthlessly, lifting Gail above a crazy tangle of struggling bodies. He thrust her feet-first through a window to the terrace outside.

"Go on!" he snapped. "Get in a car and speed!"

"Come with me! Quick!" she cried.

But he looked about him anxiously. He saw Gail's father plunge through the phantom body of the *Mole;* in its misty interior open the door of the conference room, and rush through to safety. Then swirling gas from the exploded bomb obliterated all sight.

Howls of pure panic arose about him. And Jack forced his way blindly through the window that had meant safety for Gail and tried to fumble his own way to some car with an unblinded driver. A horde of sightless, squealing men babbled and pushed. Crowded together, they had been bad enough. Opened out, now, they ran with flailing arms, hysterical with pure panic.

A fat man bumped against Jack, flinging him to one side. Somebody else

struck crazily at him, and some one careened heavily into him, and he gave ground. Then, abruptly, there was something hard and unyielding against his knees, and he toppled over.

He fell perhaps eight feet, down from the terrace outside the windows of the governor's mansion. Branches lashed at him, and then he hit something incredibly hard and solid. He felt a terrific blow on his head.

A LONG TIME later, it seemed, Jack heard the purring of machinery. He heard Gail's voice, urgent and resolute. Somebody picked him up. The noise of machinery grew louder. It roared close beside him. He felt a swimming motion.

Then, as he stirred vaguely, something hit him again, and he passed into blank unconsciousness.

When Jack opened his eyes again the noise of machinery still went on. There was again the sensation of swimming, of a gentle rocking from side to side. His head ached intolerably. Then his eyes cleared.

He was inside the *Mole*. His hands and feet were tied fast. Durran grinned at him. A rat-faced man with a convict's shaven poll was at the controls. Two others were in sight about the engine. But worst of all was the sight of Gail, very white, sitting in a crowded corner of the *Mole* and staring at vacancy.

VIII.

THROUGH the windows of the *Mole* the outside world could be seen. One glance, and Jack knew. A strange, harsh, reddish light outlined tall and unsubstantial columns reaching up to a roof of shadows. The columns rose from a cloudy, soft-seeming vapor underfoot. Over all and through all the reddish light showed.

The *Mole* swam on, and the columns swept slowly past, immobile despite their near-transparency. There was no sound from without. The thudding rumble of the gasoline engine; the whine of the dynamo and the separate driving motors—that was all. There was not even a noise as of a water wash against the hull of the earth-ship. It swam on through an eerie, a phantom world—and it was almost impossible to believe.

Shadows even passed through the interior, through all its moving parts, through the human beings within it. They paid no heed. Those shadows were tree trunks, impalpable to the dematerialized state of the *Mole* as it was impalpable to the normal world.

Durran grinned and said: "You're a very lucky young man."

Jack opened his lips and closed them.

"I said," repeated Durran amusedly, "you're a very lucky young man. You're alive."

"I hardly imagine," returned Jack evenly, "that I'll be alive very long."

"It wasn't my intention to allow it," conceded Durran. A mocking light danced in his eyes. "Miss Kennedy persuaded me otherwise. You are very fortunate to have so charming a girl so—shall I say, loyal to you?" He chuckled.

Jack was working on his bonds. Hopeless! They had been tied by some one who knew how.

"You want to know," he said slowly, "where the other earth-ships are being built to destroy you. That's why you brought me in the *Mole* instead of simply shooting me."

"You guess," said Durran, "with remarkable accuracy."

"Set her free," said Jack grimly, "and I'll tell you where they are. Otherwise you can go to hell! There's no power on earth that could make me tell while she's a prisoner."

"I disagree," said Durran. Again

his eyes mocked. "I think we could make you tell us anything. There are —er—methods. But I shan't try. I promised Miss Kennedy."

Jack's eyes turned to Gail. She stood up and came over to him, bracing herself against the swaying movements of the *Mole*. She was silent for a moment. Then:

"I told him, Jack," she said quietly. "I—I wasn't blinded by the gas. You told me to run, but I—I waited to be sure you were safe. You—didn't come outside. I didn't see you, anyway. So I started to go back to find you. And the *Mole* swam out and materialized on the lawn. I hid. Then I saw two men get out and pick you up. I recognized you. And I ran——"

"She tried to fight us," put in Durran blandly. "And I recognized her, in turn. I had her showed inside the *Mole*, and of course we brought you in. We were very busy just about then, because there were police running to shoot at us. You were unconscious. I dematerialized the *Mole* and started to navigate away. And Miss Kennedy had picked up a hand grenade and swore she'd pull the pin and blow the lot of us to smithereens unless we released you at once."

Again Jack's eyes turned upon Gail. "Good girl!" he said grimly. "I'm almost sorry that you didn't go through with it."

"It was a stalemate," said Durran as blandly as before. "Because, as I pointed out, she'd do you no good by blowing us all up. Finally we compromised. I promised to release you, unharmed, but not her, if she'd put down the grenade, and if she told me where the other earth-ships are being built."

"Jack, I—I had to! Don't you see? He promised to—only hold me for ransom."

Durran nodded. "That's all," he said comfortably. "You, Hill, will be allowed to leave the ship in ten minutes more. In fact, I'll insist on it."

Jack searched his face. The mockery, the unholy amusement in his eyes, denied the promise of safety. There was no doubting that.

"Do you mean," he asked harshly, "you're going to rematerialize the ship and put me out on solid ground, or do you mean you're going to toss me out of the door into that?"

He nodded to the vaporous, unreal cloudiness which was the earth to those within the *Mole*.

"No!" said Gail quickly. "He was laughing when he promised to let you out. I made him swear he didn't mean to put you out of the ship so you'd—drop down to the center of the earth. He said you'd stay on top, all right."

Durran laughed again.

"WELL?" snapped Jack. "What's the catch? And I tell you, Durran, no ransom you can get for her is as big as the one I can give you, of information you need! You turn her loose instead of me——"

"I'll let you decide," said Durran blandly. "You see, Hill, you gave advice on how to keep me from looting bank vaults by putting bars of iron about so I couldn't materialize any part of the *Mole* in a vault without including a bar and so blowing up the ship. The fools haven't taken your advice, but I thought they would.

"So I prepared for it."

"How?"

"I made a field-of-force generator a man could carry into a vault, dodging those bars. He could dematerialize anything I wanted and bring it back without materializing the *Mole* inside at all and even without the *Mole's* entering it. It's a good trick. I can take things out of a drawer or the smallest safe, now. A neat answer to your suggestion.

My men can walk about and pick up anything they want."

Again Jack nodded grimly at the cloudlike earth. "No man can walk about on that."

"Oh, yes, a man can! You'll see! The same trick as the sustaining screws that hold this ship up. A thin coating of thorium. I made snowshoes, my dear fellow, on the same principle. Frames covered with cloth, which is painted with radio-active paint. We are going to get a pair of those snowshoes for you. Earth-shoes would be a better name. With them upon your feet you can walk wherever you like. You can assuredly stay on top of the ground, even in your present state of dematerialization. Take my word for it—you can!"

Jack's eyes burned.

Gail stared, and then cried desperately: "But—but you're cheating! He'd starve! And—and only as long as he kept moving. You're cheating! You'd be killing him as surely and—more horribly than if you just flung him out to drop."

"But," said Durran, and chuckled, "I am holding to the strict letter of my bargain. I confess it seems to me an excellent joke. You have five minutes more, Hill, before you begin your interesting walk, unless you wish Miss Kennedy to have that freedom instead. How about it?"

Jack said grimly: "Supposing you observe the proprieties and let a condemned man have a little indulgence. I want to talk to Gail. Clear out!"

Again Durran chuckled. "And I'll do even that, instead of spending my time making just complaints about the manner in which you constructed the ship for me. My dear Hill, do you know that it is necessary to run the sustaining screws ten revolutions a minute faster than at the beginning? Why is that?"

"Repeated dematerializations," snapped Jack. "Clear out!"

He waited, his jaw set. Durran moved away, amused. It could not matter what Jack and Gail might say to each other. In five minutes more, Jack would be more utterly alone and more irrevocably doomed than any other man since time began. And Gail would remain in the *Mole*.

THE CLOUDY shapes in the harsh red light without came to an end. The shadow of a house appeared, and beyond it a low and level mist more tenuous than that of earth. It would be the water of a lake.

The *Mole* swam smoothly up to the house. Then it seemed to glow in every particle with a strange white light, which gradually diminished and died. And as it diminished, the world without became more solid. When it ended, the shadow house became a bungalow. The cloudy earth was covered with green grass. The light was vastly brighter. And this normal, natural world looked infinitely desirable.

The rat-faced man got out of the ship and went casually into the house. Squeals of delight came out. Women appeared, five of them. And they were pretty women, in their fashion. But Jack looked from them to Gail and ground his teeth. That sight was too bitter.

The rat-faced man came back, carrying two cloth-covered frames which were nothing more or less than snowshoes of entirely familiar pattern, with painted canvas stoutly sewed to the rawhide webbing. He had told the women something. They laughed shrilly. He came into the *Mole* again. Again the flash of eerie, whitish light. The *Mole* swam on smoothly.

And then Durran threw a switch and reversed the tail screw. The moving procession of shadows in a world of

harsh red light slowed down and stopped.

Durran opened the door of the *Mole*. "And now I keep my promise," he said blandly. "You are free to go. In fact, if you don't go you'll be thrown out."

Two men kept guns trained upon Jack as a third cut loose his hands. He put on the strange devices for walking in a world which was all vapor, all shadows, without substance or reality. To fight was not only hopeless, it would please Durran. And Jack had no hope, but he would not admit it. He pretended a confidence he did not feel, simply to make things easier for Gail.

"I'll see you later, Durran," he said without intonation. "I'm inclined to think you won't harm Gail, because I know what ransom you'll want. But I'll see you later!"

He stepped grimly out of the door. The stuff underfoot was soft and yielding and springy, but it seemed to give slowly from his weight. Actually, that was the thinly coated cloth sinking through the substance of the ground. If Jack stood still, he knew, he would sink down and down as into a quicksand. The earth was semisolid only to the devices upon his feet. To his body it was thin as air. If he stumbled, he would hang head down, swinging, and ultimately he would sink.

And then——

But he stood, balancing himself in a world all harsh red light and unreal shadows, with his weight resting upon the appearance of vapor. In all this universe only the *Mole* seemed real, because only the *Mole* was unreal where this world was actual.

Durran stood at a window and laughed at him. The door closed. The *Mole* swam away. Presently it was lost to sight amid the shadows of innumerable phantom trees. Jack was alone as no man had ever been alone before. He walked upon vapor, and about him were only ghosts.

IX.

THE SILENCE was ear-cracking. Silence, in the normal world, is a compound of minute noises, each one of which contributes to a blended impression of quiet. Here there was an absolute absence of sound. It was startling. It was bewildering. There was constantly a shocked impression of one's own deafness.

Stranger still, of course, was the landscape. It was like a madman's dream. The sun was visible, to be sure, but as a ball of red so dark that it was almost purple. The unearthly light which filled this place was far down the scale, nearly in the infra-red. It was the darkest tint the human eye could see. In it, the trees were more than merely translucent.

Jack was seeing by rays which normally are blanketed out by the visible spectrum. The trees seemed so tenuous, so infinitely fragile that their immobility was not credible even when Jack saw it. And their branches went away to threads and their foliage stopped so little of the strange faint light that it seemed that overhead there was only the faintest of mist. Jack saw stars shining dully in an almost-black sky.

He had stopped, rather grimly, to orient himself. Now he essayed to move. And the ungainly things strapped to his feet were fast in the earth below him. That earth seemed vapor, to be sure. But there was radio-active paint upon these weird earth-shoes. That worked the miracle.

The flying alpha particles from that paint bombarded the dematerialized substance which alone in the world was real to Jack. The effect was that of temporary, partial materialization, so that the substance of the earth-shoes was partly "real" in both states of matter.

Yet it was only partly "real" so that it still could penetrate reality. But it

did so slowly. Jack's earth-shoes had sunk a little, a very little, into the ground. But they would rise no more easily than they sank.

He felt a flash of panic, as a man might be expected to feel with a quicksand tugging at his legs. Then he forced himself to coolness. His feet had sunk perhaps six inches into the earth. He could not lift them. But he could slide them forward. He did. And the turned-up toes of the snowshoes helped, and a little later he strode forward through the impossible, a man walking upon a cloud, through shadows, beneath a sky and sun which did not seem of earth. He walked and moved, in fact, upon a world which had become itself a ghost in a universe that was phantom.

It was nightmarish, of course. It was worse than any nightmare. It was like insanity come true. And always, if he stood still, he would sink into that nightmare and strangle in the impalpable cloud which was the earth itself, and at last fall dizzily, twisting a little, down into the eternal fires which burned sullenly perhaps fifty, perhaps a hundred miles below him. But to think of that caused vertigo.

Jack headed east, holding a tight leash upon himself lest the panic which always clawed at him should seize his brain. There would be human beings to eastward. True, he would be a ghost to them, and they to him, but still—— He forced himself to note all things with a careful attention. That way would come accustomedness.

He suddenly realized that there were no smells in this strange universe. Again, like sounds, a man is normally unaware of tiny odors in the air he breathes. But their absence was strange. The air seemed strangely flat. It had the insipid flavor of boiled and hence tasteless water.

Then he saw something moving. His heart leaped for an instant. But this moving thing was itself a shadow. He watched it intently. It was a rabbit. He could look through its flesh and see the distinctly articulated, phantom bones within its mistlike body. Strangely, it seemed to see him, too. It leaped madly away. And Jack realized that, just as the rabbit seemed ghostlike to him, he would seem a ghost to it. Even more of a wraith and less visible, actually, because of the brighter light in the world of reality, whereby objects behind his no longer "material" body would be so much more distinct.

He went on, without hope, but refusing to give way until he must. In this world of impalpable things there was no solid space on which he might rest. There was no food he could eat. There was no water he could lift to his lips or swallow. And he knew all this and trudged doggedly eastward, for no conceivable reason, for hour after hour. If he had any reason for his travail, it was that he could die without yielding to the panic Durran undoubtedly expected of him.

IT WAS a ghastly journey. The earth-shoes upon his feet, clumsy and unaccustomed; the unearthly reddish light about him; the vaporous-seeming surface on which he walked; the knowledge of and the insistent nagging feeling of an abyss below him. He had no faintest idea of attaining to safety by this exertion. He knew the conditions under which hope might exist, and they were practically impossible. Without food or water or rest, with no means of communicating with any human being, with his loudest shout in the ear of a man but the faintest thread of a whisper—because he was a ghost——

A ghost!

Once he passed through a tiny country village. He saw ghosts about him, living in phantom houses, engaged in unreal tasks. He was unseen by hu-

mans, but dogs barked at him, frightened, terrified, the hackles at the top of their necks raised and bristling. Their barks were the faintest of whispers. He went on because their uproar made a phantom baby wake and wail soundlessly.

On—on.

He strode on for hours, desperately, watching without hope for something which might give hope. The dark-red, nearly purple, sun sank low. He had emerged from the phantom woods long since and now plodded across a vaporous open space which was featureless and unmeaning. The cloudiness rose above his earth-shoes, now. It was probably a growing crop of wheat or rye, unseeable save as mist. Ever and again he turned to look his last upon the sun. And very suddenly it vanished and all this unreal world was dark.

There were infinitely faint reddish lights in the sky overhead—stars. He stood upon a vapor that he could not see and that was not tangible to his hands. In all the world there was not one solid thing besides his body and the ungainly objects upon his feet. He was exhausted. He was weak with hunger and thirst and half mad with the knowledge of doom upon him and that impending drop down into the smoldering fires that burn eternally at the center of the earth.

Two small red glows, like fireflies, swept through the blackness from a spot to the right of him. They moved almost before him and vanished abruptly. He plodded on. Two others. They were nearer. Again they vanished when before him. A curious tail of flickering flame seemed to follow them. He was almost too weary even to be curious. But somewhere in his brain a voice said:

"Motor cars. That tail of flame is the exhaust. It's hot enough to give off infra-red, and that's what you see by."

He plodded on. Sooner or later he would stagger from the exhaustion that crept upon him. His muscles would refuse to obey him. He would stumble. He would fall——

Then he saw a row of dim red specks. They did not move. He regarded them dully. They would be the electric bulbs of a filling-station sign. He turned and moved drearily toward them. He would die, at least, near human beings he could not even signal to. He was very tired indeed. Presently the dim red specks stretched in the three sides of a rectangle above his head. That was the roof of the service cover. And the lights were probably very bright ones, because he made out very faintly indeed the phantom of the filling station itself. He walked through the walls of that phantom. A brighter reddish glow shone there—a round ring of light. No; two round rings of light. He regarded them apathetically. He was too tired to think clearly. He found himself reaching out his hand. He touched one of the rings of light. It burned him. It was, actually, the gasoline burner of a hot-dog boiler.

"Curious," he said dully to himself. "In theory, if it burned me, I must have affected the flame. And if there is a man near by—but there must be—I could signal to him if we both knew dots and dashes."

Then he shrugged hopelessly. His finger hurt. It was severely scorched, but there was not enough light to see. He made a helpless gesture with his scorched hand—and the burned finger touched something solid.

For a moment he was dazed. Sheer shock made him dizzy. He touched the thing again. It was hot and scorched his burned finger. It was impalpable to the unburned ones.

Jack gasped. "I feel—I feel a stove!"

Then he panted to himself, all alone in the unthinkable universe of his own discovery.

"Radio-activity knocks some of the

atoms loose from their coördination. Fire, heat, ought to do the same thing. Especially if it caused chemical change —as it does when it scorches my skin. Heat demagnetizes steel, too. It ought to—it ought to materialize——"

He held his hand savagely to the flame. It was agony. It was torment. He scorched it all over, going sick from pain. And then he groped. He felt a wall. He fumbled, and fumbled——

X.

THE FORTY-EIGHT hours given to the City of New York would expire at four p. m. At a little after three, Jack got rather stiffly out of a motorcycle side car at the isolated spot in New Jersey where the city's ransom was to be paid. The State trooper who'd brought him roared his machine away. Gail's father nodded to Jack, his face gray and drawn.

"I heard you were released," he said jerkily, "and that Gail was all right when you were turned loose."

"She was all right," said Jack composedly. "But I wasn't turned loose in the way you mean. You're here to deliver the city's ransom?"

Kennedy nodded and licked his lips. "I asked for the job," he said desperately. "I hope to see Gail and make terms with Durran for her release, too, you see."

"He'll ask," said Jack, "for one of the new earth-ships. That's the price, I'm fairly sure."

"He blew up four of them yesterday," said Kennedy bitterly. "They couldn't be moved as you wired they had to be. One was got away. He'll get the rest to-morrow, probably."

Jack nodded. He got out a cigarette and lighted it. His fingers quivered like tuning forks.

"Listen!" he said suddenly.

He told Gail's father just how Gail had desperately bought his life by telling where the new earth-ships were being built. He told how Durran had cheated on the contract, amusedly, while holding to the strict letter of his agreement. He told of his horrible journey in that world which was not reality, and of the accidental discovery that the scorching of his own flesh would destroy the effect of the force field upon it, just as heat will destroy the magnetism of a bar of steel.

"I scorched my hand pretty thoroughly," he finished, "and felt around. I found the desk where the hot-dog man balanced up accounts. I found his pencil and wrote a message to him, telling who I was and how I came to be there. I attracted his attention by pounding his inkwell on the top of his desk."

"Luckily, he wasn't just superstitious. He tried to find out what was happening. The radio broadcasts had told about my being carried away in the *Mole*. The hot-dog man took a chance. He put his stove down on the floor. And I balanced myself on one of those earth-shoes and scorched the soles of my own leather shoes. I tried them. And the heat had rematerialized the bottom layer of the leather.

"I could stand on the floor of the hot-dog stand! At last I had some hope to cling to!

"Then I scorched the earth-shoes, too. The hot-dog man could see them, then. And they wouldn't sink through the floor at all. He believed me. I tore off bits of canvas that had been scorched. He could see them, too, and so could I. He put one over his ear as I'd told him to, in writing. One side was rematerialized by the heat. The other wasn't quite scorched and was real to me.

"I shouted at it. My voice vibrated my side of the cloth, and that made his side vibrate. In a little while he made me hear him, too, in the same way. We

had to scream at each other, though with the hand I'd scorched I could touch him. It nearly scared him to death the first time I did it. Then he telephoned for me. And I lay down on the earth-shoes on the floor, and waited. They brought a force-field outfit and rematerialized me.

"I nearly keeled over when I saw the world actual about me again."

Kennedy had listened. He had to. But his thoughts were with Gail.

"But Gail——"

"Look at my hands," said Jack jerkily. He held them out. They quivered. "I found out something Durran doesn't know. It's a show-down. Either we get Gail back when Durran turns up, or—there's no hope for her at all."

"What's the matter?"

"Durran's doomed," said Jack unsteadily. "He doesn't know it. I do. He told me he was having to run the sustaining screws ten revolutions a minute faster than at the beginning. And Gail's in the *Mole*. You see what that means?"

"No. What's happened?"

"The sustaining screws hold the *Mole* up," replied Jack, puffing nervously, "because they're coated with thorium. If it wasn't for that and their movement, the ship would drop like a stone. And that thorium plating is wearing off. Durran doesn't realize it, but the *Mole's* traveled a long way. When he's run it a certain time longer, so much of the plating will have worn off that no speed will enable the sustaining screws to hold the ship up. So we've got to get Gail out of the *Mole* to-day." His eyes met the other's evenly.

Kennedy's face was gray and drawn. It went grayer yet. "What are you going to do?"

"Ransom her," replied Jack. "If Durran sees me here, he won't go away leaving me alive. I hope he'll be curious enough to ask me how I escaped. Then I can talk to him. Did you see a plane sweep low across this place early this morning?"

Kennedy shook his head.

"It was supposed to dust the ground all about here," said Jack jerkily. "Like they dust crops by plane. That's part of the trick. I have the rest in my pocket. Where's the ransom for New York?"

Kennedy gestured toward half a dozen suitcases. "Full of currency," he said indifferently. "State troopers all around us in a ring a couple of miles across. Durran's been looking over the place, we may be sure. He's probably watching us now."

Jack nodded. He flung his cigarette away and lighted another.

"I've only about as long as it takes Durran to get here," he said unsteadily, "before I get bumped off. I'm hoping—I'm praying I get Gail clear. Only one chance, and that a thin one. But Durran goes, and I think I go with him."

"But what are you going to do?" demanded Kennedy desperately. "What——" Then he stopped.

THE *MOLE*, a phantom, was rising out of the ground not a dozen yards away. It came fully into view, and the whitish, eerie light of the force field played upon it, diminishing. As it diminished, the *Mole* solidified. And as it solidified the screws found the earth in which they worked becoming more and more solid and they slowed and then finally stopped from the increased resistance.

The door opened. The ugly muzzle of a machine gun peered out.

"I've scouted pretty thoroughly," said the voice of Durran harshly, "and there's no trap here. I hope you didn't plan to have me bombed from the air, Kennedy. I've got your daughter with me."

"N-no," said Kennedy. He swallowed. "I—I arranged to meet you so I could make terms for her ransom. Can I—speak to her?"

A pause.

Durran laughed. "Why not? Go out, my dear, and talk to him. I can take you back any time I please——"

His voice broke off short. He'd recognized Jack.

"Hello, Durran," said Jack coolly. "You didn't like the last bargain I made with you. But it still stands as an offered ransom for Gail."

Gail stepped out of the *Mole,* deathly white, and suddenly ran into her father's arms. She sobbed in sheer relief as she clung to him. "Jack isn't dead!"

"Talk to you later, Gail," said Jack evenly. "I'm going to make a bargain for you to stay with your father."

Durran found his voice again. "The devil!" he said, shaken. "I thought you were roasted long ago, Hill! I'll make sure you're dead before I leave this time!"

"Perhaps," said Jack. "I offered you information, while I was in the *Mole,* in exchange for Gail's safety. Kill me and you don't get it. It's about—this."

He took a flat package, about the size of a tobacco tin, out of his pocket. The ugly muzzle of the machine gun swung and covered him accurately.

"You're covered," said Durran. "What's the trick?"

"You can't dematerialize within a certain distance of one of these contrivances," said Jack. "They're being turned out in quantity. The result is that if you materialize anywhere these things have been planted, you can't get away and are subject to attack. I'll trade full information, and come with you to give it, for Gail's release. Maybe you can beat them. I doubt it. But you can work out a detector for them, if you know how they work."

"That's impossible!" snapped Durran.

"So is the *Mole,*" submitted Jack. "You can't dematerialize your ship right now. Isn't the secret of that trick worth Gail's release?"

A pause.

Durran's voice sounded suspicious. "If it's true. That might be a bomb, though. You stay where you are. I'm going to test it out. This machine gun stays trained on you. I turn on the force field. If you lie, I can materialize again fast enough to kill you."

"But you can't dematerialize," said Jack. He smiled faintly. "You're inside the range of this thing."

Only a grunt came from inside the *Mole.* Something rumbled within. The sustaining screws stirred. Instantly the ship flashed into the state of coördinated atoms, they would whir swiftly, looking like the most tenuous of froth but sustaining the whole weight of the earth-ship.

"If you dare move," said Durran harshly, "I'll kill all three of you!"

Then the *Mole* flared with eerie, whitish light. It became a phantom.

And it dropped with a headlong swiftness at one and the same instant. One instant there was the *Mole,* all solid, riveted, bullet-scarred plates of steel. Next instant there was a glowing outline which fell as it glowed. Then there was nothing. No phantom. No outline. Nothing.

Jack smiled very, very faintly. "I think," he said softly, "that's that!"

Gail stared at him. "Jack! Where's the *Mole?*"

Jack said rather grimly: "The thorium plating on the sustaining screws has been wearing thin. So this morning I had a plane fly low over this place Durran had appointed. It dusted all the top of the ground with crystals of phosphoric acid. There's been rain lately, and the ground is moist. The acid made a strong solution in all the top soil. And

the *Mole* came swimming through that soil. As long as it was dematerialized, of course, the acid did nothing. But when the *Mole* materialized, the phosphoric acid dissolved off the remaining thin plating of thorium from the screws. And I persuaded Durran to dematerialize—and there was nothing to hold the ship up. It fell through earth and stone. It's still falling. We'll never see Durran again."

Gail said, rather absurdly: "Jack! The *Mole* you built! It's gone!"

"Yes," said Jack. "And I expected to be in it. I was sure Durran would make me come in, but he was afraid that 'contrivance' was a bomb. It was, and I've another in my pocket. With you outside of the *Mole* and me inside with two bombs—I told your father Durran would go. He—had to be finished."

But he looked rather sick. The *Mole* would still be falling—toward those smoldering internal fires to which Durran had doomed him once.

Then, quite suddenly, the ground trembled. A distant, muted, racking sound came from far, far underground. It ceased.

"That—that ends it," said Jack. "Durran knew what he was falling to. He was clever. He probably even figured out what I did. So he blew up the ship rather than wait. I'm rather glad of that."

SILENCE! Little rustling noises of leaves and grass in the wind.

Then Kennedy said fiercely: "That's done with, then! Durran's finished! And we'll get back to work! You, Jack, you'll be needed to explain that earth-plane idea. We'll have under-ocean passenger service to Europe within a year. We'll have fleets of earth-planes moving through solidity, safer than airplanes or ships could be. And we'll be mining ten and twenty miles deep with those mine cages you talked about——"

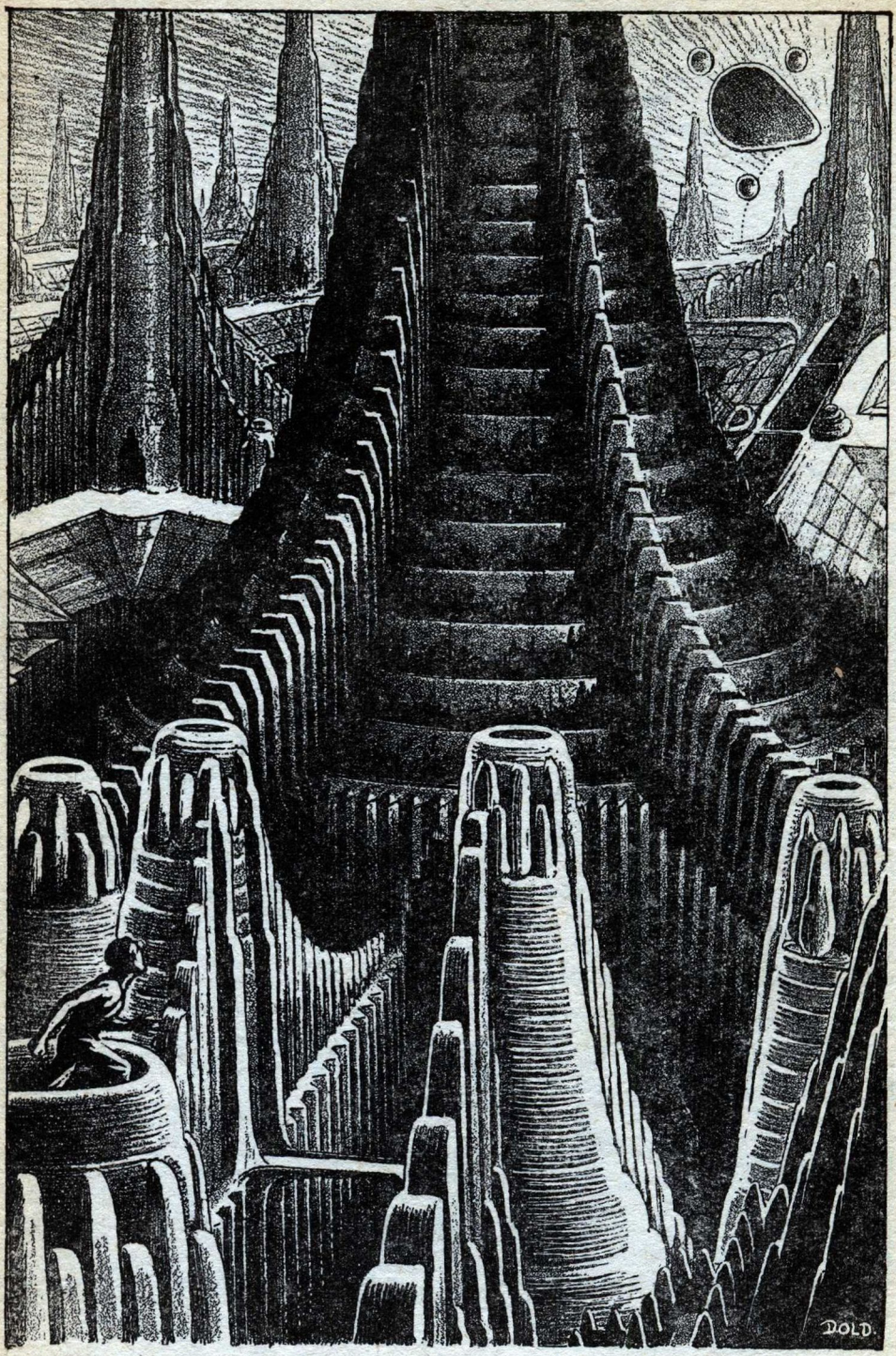
But Gail let go of her father's hands. She walked over to Jack and into his arms.

"My father thinks you've made good, Jack," she told him. "Now, you tell him there's something very important to be attended to before you do any more work on those nasty earth-ships!"

Jack pressed her close.

"Yes; there is. Do you mind attending a wedding this afternoon, sir?" he asked Kennedy.

"Not at all," replied Kennedy with a grimace. "You two stay here a moment while I get those State police. Watch these bags, if you can. The ransom for New York is in them. It's got to be taken back."



Then I saw the city of perfect machines.

Illustrated by Elliot Dold

TWILIGHT

A story that will set you to dreaming of purple distances—of a far future world wherein a race is dying seven million years away—seven million years!

by Don A. Stuart

SPEAKING of hitch-hikers," said Jim Bendell in a rather bewildered way, "I picked up a man the other day that certainly was a queer cuss." He laughed, but it wasn't a real laugh. "He told me the queerest yarn I ever heard. Most of them tell you how they lost their good jobs and tried to find work out here in the wide spaces of the West. They don't seem to realize how many people we have out here. They think all this great beautiful country is uninhabited."

Jim Bendell's a real-estate man, and I knew how he could go on. That's his favorite line, you know. He's real worried because there's a lot of homesteading plots still open out in our State. He talks about the beautiful country, but he never went farther into the desert than the edge of town. 'Fraid of it actually. So I sort of steered him back on the track.

"What did he claim, Jim? Prospector who couldn't find land to prospect?"

"That's not very funny, Bart. No; it wasn't only what he claimed. He didn't even claim it, just said it. You know, he didn't say it was true, he just said it. That's what gets me. Darn it, I know it ain't true, but the way he said it—— Oh, I don't know."

By which I knew he didn't. Jim Bendell's usually pretty careful about his English—real proud of it. When he slips, that means he's disturbed. Like the time he thought the rattlesnake was a stick of wood and wanted to put it on the fire.

Jim went on: And he had funny clothes, too. They looked like silver, but they were soft as silk. And at night they glowed just a little.

I picked him up about dusk. Really picked him up. He was lying off about ten feet from the South Road. I thought, at first, somebody had hit him, and then hadn't stopped. Didn't see him very clearly, you know. I picked him up, put him in the car, and started on. I had about three hundred miles to go, but I thought I could drop him at Warren Spring with Doc Vance. But he came to in about five minutes, and opened his eyes. He looked up straight off, and he looked first at the car, then at the Moon. "Thank God!" he says, and then looks at me. It gave me a shock. He was beautiful. No; he was handsome.

He wasn't either one. He was magnificent. He was about six feet two, I think, and his hair was brown, with a touch of red-gold. It seemed like fine copper wire that's turned brown. It was crisp and curly. His forehead was wide, twice as wide as mine. His features were delicate, but tremendously impressive; his eyes were gray, like etched iron, and bigger than mine—a lot.

That suit he wore—it was more like a bathing suit with pajama trousers. His arms were long and muscled smoothly as an Indian's. He was white, though, tanned lightly with a golden, rather than a brown, tan.

But he was magnificent. Most wonderful man I ever saw. I don't know, darn it!

"HELLO!" I said. "Have an accident?"

"No; not this time, at least."

And his voice was magnificent, too. It wasn't an ordinary voice. It sounded like an organ talking, only it was human.

"But maybe my mind isn't quite steady yet. I tried an experiment. Tell me what the date is—year and all, and let me see," he went on.

"Why—December 9, 1932," I said.

And it didn't please him. He didn't like it a bit. But the wry grin that came over his face gave way to a chuckle.

"Over a thousand——" he says reminiscently. "Not as bad as seven million. I shouldn't complain."

"Seven million what?"

"Years," he said, steadily enough. Like he meant it. "I tried an experiment once. Or I will try it. Now I'll have to try again. The experiment was—in 3059. I'd just finished the release experiment. Testing space then. Time—it wasn't that, I still believe. It was space. I felt myself caught in that field, but I couldn't pull away. Field gamma-H 481, intensity 935 in the Pellman range. It sucked men in—and I went out.

"I think it took a short cut through space to the position the solar system will occupy. Through a higher dimension, effecting a speed exceeding light, and throwing me into the future plane."

He wasn't telling me, you know. He was just thinking out loud. Then he began to realize I was there.

"I couldn't read their instruments, seven million years of evolution changed everything. So I overshot my mark a little coming back. I belong in 3059.

"But tell me, what's the latest scientific invention of this year?"

He startled me so, I answered almost before I thought.

"Why—television, I guess. And radio and airplanes."

"Radio—good. They will have instruments."

"But see here—who are you?"

"Ah—I'm sorry. I forgot," he replied in that organ voice of his. "I am Ares Sen Kenlin. And you?"

"James Waters Bendell."

"Waters—what does that mean—I do not recognize it?"

"Why—it's a name, of course. Why should you recognize it?"

"I see—you have not the classification, then. 'Sen' stands for science."

"Where did you come from, Mr. Kenlin?"

"Come from?" He smiled, and his voice was slow and soft. "I came out of space across seven million years or more. They had lost count—the men had. The machines had eliminated the unneeded service. They didn't know what year it was. But before that—my home is in the Neva'th City in the year 3059."

That's when I began to think he was a nut.

"I was an experimenter," he went on. "Science, as I have said. My father was a scientist, too, but in human genetics. I myself am an experiment. He proved his point, and all the world followed suit. I was the first of the new race.

"The new Race—oh, holy destiny—what has—what will——

"What is its end? I have seen it—almost. I saw them—the little men—bewildered—lost. And the machines. Must it be—can't anything sway it?

"Listen—I heard this song."

He sang the song. Then he didn't have to tell me about the people. I

knew them. I could hear their voices, in the queer, crackling, un-English words. I could read their bewildered longings. It was in a minor key, I think. It called, it called and asked, and hunted hopelessly. And over it all the steady rumble and whine of the unknown, forgotten machines.

The machines that couldn't stop, because they had been started, and the little men who had forgotten how to stop them, or even what they were for, looking at them and listening—and wondering. They couldn't read or write any more, and the language had changed, you see, so the phonic records of their ancestors meant nothing to them.

But that song went on, and they wondered. And they looked out across space and they saw the warm, friendly stars—too far away. Nine planets they knew and inhabited. And locked by infinite distance, they couldn't see another race, a new life.

And through it all—two things. The machines. Bewildered forgetfulness. And maybe one more. Why?

That was the song, and it made me cold. It shouldn't be sung around people of to-day. It almost killed something. It seemed to kill hope. After that song—I—well, I believed him.

WHEN he finished the song, he didn't talk for a while. Then he sort of shook himself.

You won't understand (he continued). Not yet—but I have seen them. They stand about, little misshapen men with huge heads. But their heads contain only brains. They had machines that could think—but somebody turned them off a long time ago, and no one knew how to start them again. That was the trouble with them. They had wonderful brains. Far better than yours or mine. But it must have been millions of years ago when they were turned off, too, and they just hadn't thought since then. Kindly little people. That was all they knew.

When I slipped into that field it grabbed me like a gravitational field whirling a space transport down to a planet. It sucked me in—and through. Only the other side must have been seven million years in the future. That's where I was. It must have been in exactly the same spot on Earth's surface, but I never knew why.

It was night then, and I saw the city a little way off. The Moon was shining on it, and the whole scene looked wrong. You see, in seven million years, men had done a lot with the positions of the planetary bodies, what with moving space liners, clearing lanes through the asteroids, and such. And seven million years is long enough for natural things to change positions a little. The Moon must have been fifty thousand miles farther out. And it was rotating on its axis. I lay there a while and watched it. Even the stars were different.

There were ships going out of the city. Back and forth, like things sliding along a wire, but there was only a wire of force, of course. Part of the city, the lower part, was brightly lighted with what must have been mercury vapor glow, I decided. Blue-green. I felt sure men didn't live there—the light was wrong for eyes. But the top of the city was so sparsely lighted.

Then I saw something coming down out of the sky. It was brightly lighted. A huge globe, and it sank straight to the center of the great black-and-silver mass of the city.

I don't know what it was, but even then I knew the city was deserted. Strange that I could even imagine that, I who had never seen a deserted city before. But I walked the fifteen miles over to it and entered it. There were machines going about the streets, repair machines, you know. They couldn't understand that the city didn't need to go

on functioning, so they were still working. I found a taxi machine that seemed fairly familiar. It had a manual control that I could work.

I don't know how long that city had been deserted. Some of the men from other cities said it was a hundred and fifty thousand years. Some went as high as three hundred thousand years. Three hundred thousand years since human foot had been in that city. The taxi machine was in perfect condition, functioned at once. It was clean, and the city was clean and orderly. I saw a restaurant and I was hungry. Hungrier still for humans to speak to. There were none, of course, but I didn't know.

The restaurant had the food displayed directly, and I made a choice. The food was three hundred thousand years old, I suppose. I didn't know, and the machines that served it to me didn't care, for they made things synthetically, you see, and perfectly. When they made those cities, they forgot one thing. They didn't realize that things shouldn't go on forever.

It took me six months to make my apparatus. And near the end I was ready to go and, from seeing those machines go blindly, perfectly, on in orbits of their duties with the tireless, ceaseless perfection their designers had incorporated in them, long after those designers and their sons, and their sons' sons had no use for them——

When Earth is cold, and the Sun has died out, those machines will go on. When Earth begins to crack and break, those perfect, ceaseless machines will try to repair her——

I LEFT the restaurant and cruised about the city in the taxi. The machine had a little, electric-power motor, I believe, but it gained its power from the great, central, power radiator. I knew before long that I was far in the future. The city was divided into two sections, a section of many strata where machines functioned smoothly, save for a deep, humming beat that echoed through the whole city like a vast, unending song of power. The entire metal framework of the place echoed with it, transmitted it, hummed with it. But it was soft and restful, a reassuring beat.

There must have been thirty levels above ground and twenty more below, a solid block of metal walls and metal floors and metal and glass and force machines. The only light was the blue-green glow of the mercury vapor arcs. The light of mercury vapor is rich in high-energy-quanta which affects the alkali metal atoms readily to photo-electric activity. Or perhaps that is beyond the science of your day? I have forgotten.

But they had used that light because many of their worker machines needed sight. They were marvelous. For five hours I wandered through the vast power plant on the very lowest level, watching them, and because there was motion, and that pseudo, mechanical life, I felt less alone.

The generators I saw were a development of the release I had discovered—when? The release of the energy of matter, I mean, and I knew when I saw that for what countless ages they could continue.

The entire lower block of the city was given over to the machines. Thousands. But most of them seemed idle, or, at most, running under light load. I recognized a telephone apparatus, and not a single signal came through. There was no life in the city. Yet when I pressed a little stud beside the screen on one side of the room, the machine began working instantly. It was ready. Only no one needed it any more. The men knew how to die, and be dead, but the machines didn't.

Finally I went up to the top of the city, the upper level. It was a paradise.

There were shrubs and trees and parks, glowing in the soft light that they had learned to make in the very air. They had learned it five million years or more before. Two million years ago they forgot. But the machines didn't, and they were still making it. It hung in the air, soft, silvery light, slightly rosy, and the gardens were shadowy with it. There were no machines here now, but I knew that in daylight they must come out and work on these gardens, keeping them a paradise for masters who had died, and stopped moving, as they could not.

In the desert outside the city it had been cool, and very dry. Here the air was soft, warm and sweet with the scent of blooms that men had spent several hundreds of thousands of years perfecting.

Then somewhere music began. It began in the air and spread softly through it. The Moon was just setting now, and as it set, the rosy-silver glow waned and the music grew stronger.

It came from everywhere and from nowhere. It was within me. I do not know how they did it. And I do not know how such music could be written.

Savages make music too simple to be beautiful, but it is stirring. Semi-savages write music beautifully simple, and simply beautiful. Your Negro music was your best. They knew music when they heard it and sang it as they felt it. Semicivilized peoples write great music. They are proud of their music, and make sure it is known for great music. They make it so great it is top-heavy.

I had always thought our music good. But that which came through the air was the song of triumph, sung by a mature race, the race of man in its full triumph! It was man singing his triumph in majestic sound that swept me up; it showed me what lay before me; it carried me on.

And it died in the air as I looked at the deserted city. The machines should have forgotten that song. Their masters had, long before.

I came to what must have been one of their homes, it was a dimly seen doorway in the dusky light, but as I stepped up to it, the lights which had not functioned in three hundred thousand years illuminated it for me with a green-white glow, like a firefly, and I stepped into the room beyond. Instantly something happened to the air in the doorway behind me; it was as opaque as milk. The room in which I stood was a room of metal and stone. The stone was some jet-black substance with the finish of velvet, and the metals were silver and gold. There was a rug on the floor, a rug of just such material as I am wearing now, but thicker and softer. There were divans about the room, low and covered with these soft, metallic materials. They were black and gold and silver, too.

I had never seen anything like that. I never shall again, I suppose, and my language and yours were not made to describe it.

THE BUILDERS of that city had right and reason to sing that song of sweeping triumph, triumph that swept them over the nine planets and the fifteen habitable moons.

But they weren't there any more, and I wanted to leave. I thought of a plan and went to a subtelephone office to examine a map I had seen. The old World looked much the same. Seven or even seventy million years doesn't mean much to old Mother Earth. She may even succeed in wearing down those marvelous machine cities. She can wait a hundred million or a thousand million years, or even a hundred thousand million years before she is beaten.

I tried calling different city centers

shown on the map. I had quickly learned the system when I examined the central apparatus.

I tried once—twice—thrice—a round dozen times. Yawk City, Lunon City, Paree, Shkago, Singpor, others. I was beginning to feel that there were no more men on all Earth. And I felt crushed, as at each city the machines replied and did my bidding. The machines were there in each of those far vaster cities, for I was in the Neva City of their time. A small city. Yawk City was more than fifty kilometers in diameter.

In each city I had tried several numbers. Then I tried San Frisco. There was some one there, and a voice answered and the picture of a human appeared on the little glowing screen. I could see him start and stare in surprise at me. Then he started speaking to me. I couldn't understand, of course. I can understand your speech, and you mine, because your speech of this day is largely recorded on records of various types and has influenced our pronunciation.

Some things are changed, names of cities, particularly, because names of cities are apt to be polysyllabic, and used a great deal. People tend to elide them, shorten them. I am in—Nee-vah-dah—as you would say? We say only Neva. And Yawk State. But it is Ohio and Iowa still. Over a thousand years, effects were small on words, because they were recorded.

But seven million years had passed, and the men had forgotten the old records, used them less as time went on, and their speech varied till the time came when they could no longer understand the records. They were not written any more, of course.

Some men must have arisen occasionally among that last of the race and sought for knowledge, but it was denied them. An ancient writing can be translated if some basic rule is found. An ancient voice though—and when the race has forgotten the laws of science and the labor of mind.

So his speech was strange to me as he answered over that circuit. His voice was high in pitch, his words liquid, the tones sweet. It was almost a song as he spoke. He was excited and called others. I could not understand them, but I knew where they were. I could go to them.

So I went down from the paradise of gardens, and as I prepared to leave, I saw dawn in the sky. The strange, bright stars winked and twinkled and faded. Only one, bright, rising star was familiar—Venus. She shone golden now. Finally, as I stood watching for the first time that strange heaven, I began to understand what had first impressed me with the wrongness of the view. The stars, you see, were all different.

In my time—and yours, the solar system is a lone wanderer that, by chance, is passing across an intersection point of Galactic traffic. The stars we see at night are the stars of moving clusters you know. In fact our system is passing through the heart of the Ursa Major group. Half a dozen other groups center within five hundred light-years of us.

But during those seven millions of years, the Sun had moved out of the group. The heavens were almost empty to the eye. Only here and there shone a single faint star. And across the vast sweep of black sky swung the band of the Milky Way. The sky was empty.

That must have been another thing those men meant in their songs—felt in their hearts. Loneliness—not even the close, friendly stars. We have stars within half a dozen light-years. They told me that their instruments, which gave directly the distance to any star, showed that the nearest was one hun-

dred and fifty light-years away. It was enormously bright. Brighter even than Sirius of our heavens. And that made it even less friendly, because it was a blue-white supergiant. Our Sun would have served as a satellite for that star.

I STOOD there and watched the lingering rose-silver glow die as the powerful blood-red light of the Sun swept over the horizon. I knew by the stars, now, that it must have been several millions of years since my day; since I had last seen the Sun sweep up. And that blood-red light made me wonder if the Sun itself was dying.

An edge of it appeared, blood-red and huge. It swung up, and the color faded, till in half an hour it was the familiar yellow-gold disk.

It hadn't changed in all that time.

I had been foolish to think that it would. Seven million years—that is nothing to Earth, how much less to the Sun? Some eight thousand thousand thousand times it had risen since I last saw it rise. Eight thousand thousand thousand days. If it had been that many years—I might have noticed a change.

The universe moves slowly. Only life is not enduring; only life changes swiftly. Eight short millions of years. Eight days in the life of Earth—and the race was dying. It had left something, machines. But they would die, too, even though they could not understand. So I felt. I—may have changed that. I will tell you. Later.

For when the Sun was up, I looked again at the sky and the ground, some fifty floors below. I had come to the edge of the city.

Machines were moving on that ground, leveling it, perhaps. A great, wide line of gray stretched off across the level desert straight to the east. I had seen it glowing faintly before the Sun rose—a roadway for ground machines. There was no traffic on it.

I saw an airship slip in from the east. It came with a soft, muttering whine of air, like a child complaining in sleep; it grew to my eyes like an expanding balloon. It was huge when it settled in a great port-slip in the city below. I could hear now the clang and mutter of machines, working on the materials brought in, no doubt. The machines had ordered raw materials. The machines in other cities had supplied. The freight machines had carried them here.

San Frisco and Jacksville were the only two cities on North America still used. But the machines went on in all the others, because they couldn't stop. They hadn't been ordered to.

Then high above something appeared, and from the city beneath me, from a center section, three small spheres rose. They, like the freight ship, had no visible driving mechanisms. The point in the sky above, like a black star in a blue space, had grown to a moon. The three spheres met it high above. Then together they descended and lowered into the center of the city, where I could not see them.

It was a freight transport from Venus. The one I had seen land the night before had come from Mars, I learned.

I moved after that and looked for some sort of a taxi-plane. They had none that I recognized in scouting about the city. I searched the higher levels, and here and there saw deserted ships, but far too large for me, and without controls.

It was nearly noon—and I ate again. The food was good.

I knew then that this was a city of the dead ashes of human hopes. The hopes of not *a* race, not the whites, nor the yellow, nor the blacks, but the human race. I was mad to leave it. I was afraid to try the ground road to

the west, for the taxi I drove was powered from some source in the city, and I knew it would fail before many miles.

It was afternoon when I found a small hangar near the outer wall of the vast city. It contained three ships. I had been searching through the lower strata of the human section—the upper part. There were restaurants and shops and theaters there. I entered one place where, at my entrance, soft music began, and colors and forms began to rise on a screen before me.

They were the triumph songs in form and sound and color of a mature race, a race that had marched steadily upward through five millions of years—and didn't see the path that faded out ahead, when they were dead and had stopped, and the city itself was dead—but it hadn't stopped. I hastened out of there—and the song that had not been sung in three hundred thousand years died behind me.

But I found the hangar. It was a private one, likely. Three ships. One must have been fifty feet long and fifteen in diameter. It was a yacht, a space yacht probably. One was some fifteen feet long and five feet in diameter. That must have been the family air machine. The third was a tiny thing, little more than ten feet long and two in diameter. I had to lie down within it, evidently.

There was a periscopic device that gave me a view ahead and almost directly above. A window that permitted me to see what lay below—and a device that moved a map under a frosted-glass screen and projected it onto the screen in such a way that the cross hairs of the screen always marked my position.

I SPENT half an hour attempting to understand what the makers of that ship had made. But the men who made that were men who held behind them the science and knowledge of five millions of years and the perfect machines of those ages. I saw the release mechanism that powered it. I understood the principles of that and, vaguely, the mechanics. But there were no conductors, only pale beams that pulsed so swiftly you could hardly catch the pulsations from the corner of the eye. They had been glowing and pulsating steadily, some half dozen of them, for three hundred thousand years at least; probably more.

I entered the machine, and instantly half a dozen more beams sprang into being, there was a slight suggestion of a quiver, and a queer strain ran through my body. I understood in an instant, for the machine was resting on gravity nullifiers. That had been my hope when I worked on the space fields I discovered after the release.

But they had had it for millions of years before they built that perfect, deathless machine. My weight entering it had forced it to readjust itself and simultaneously to prepare for operation. Within, an artificial gravity equal to Earth's had gripped me, and the neutral zone between the outside and the interior had caused the strain.

The machine was ready. I was fully fueled, too. You see they were equipped to tell automatically their wants and needs. They were almost living things, every one. A caretaker machine kept them supplied, adjusted, even repaired them when need be, and when possible. If it was not, I learned later, they were carried away in a service truck that came automatically, replaced by an exactly similar machine, and carried to the shops where they were made, and automatic machines made them over.

The machine waited patiently for me to start. The controls were simple, obvious. There was a lever at the left that you pushed forward to move forward, pulled back to go back. On the right a horizontal, pivoted bar. If you

swung it left, the ship spun left; if right, the ship spun right. If tipped up, the ship followed it, and likewise for all motions other than backward and forward. Raising it bodily raised the ship as depressing it depressed the ship.

I lifted it slightly, a needle moved a bit on a gauge comfortably before my eyes as I lay there, and the floor dropped beneath me. I pulled the other control back, and the ship gathered speed as it moved gently out into the open. Releasing both controls into neutral, the machine continued till it stopped at the same elevation, the motion absorbed by air friction. I turned it about, and another dial before my eyes moved, showing my position. I could not read it, though. The map did not move, as I had hoped it would. So I started toward what I felt was west.

I could feel no acceleration in that marvelous machine. The ground simply began leaping backward, and in a moment the city was gone. The map unrolled rapidly beneath me now, and I saw that I was moving south of west. I turned northward slightly and watched the compass. Soon I understood that, too, and the ship sped on.

I had become too interested in the map and the compass, for suddenly there was a sharp buzz and, without my volition, the machine rose and swung to the north. There was a mountain ahead of me, I had not seen, but the ship had.

I noticed then what I should have seen before—two little knobs that would move the map. I started to move them and heard a sharp clicking, and the pace of the ship began decreasing. A moment and it had steadied at a considerably lower speed, the machine swinging to a new course. I tried to right it, but to my amazement the controls did not affect it.

It was the map, you see. It would either follow the course or the course would follow it. I had moved it and the machine had taken over control of its own accord. There was a little button I could have pushed—but I didn't know. I couldn't control the ship until it finally came to rest and lowered itself to a stop six inches from the ground in the center of what must have been the ruins of a great city, Sacramento, probably.

I understood now, so I adjusted the map for San Frisco, and the ship went on at once. It steered itself around a mass of broken stone, turned back to its course, and headed on, a bullet-shaped, self-controlled dart.

It didn't descend when it reached San Frisco. It simply hung in the air and sounded a soft musical hum. Twice. Then it waited. I waited, too, and looked down.

There were people here. I saw the humans of that age for the first time. They were graceful, tall, slim people, with heads disproportionately large. But not extremely so.

Their eyes impressed me most. They were huge, and when they looked at me there was a power in them that seemed sleeping, but too deeply to be roused.

I took the manual controls then and landed. And no sooner had I got out, then the ship rose automatically and started off by itself. They had automatic parking devices. The ship had gone to a public hangar, the nearest, where it would be automatically serviced and cared for. There was a little call set I should have taken with me when I got out. Then I could have pressed a button and called it to me—wherever I was in that city.

THE PEOPLE about me began talking—singing almost—among themselves. Others were coming up leisurely. Men and women—but there

seemed no old and few young. What few young there were, were treated almost with respect, carefully taken care of less a careless footstep on their toes or a careless step knock them down.

There was reason, you see. They lived a tremendous time. Some lived as long as three thousand years. Then —they simply died. They didn't grow old, and it never had been learned why people died as they did. The heart stopped, the brain ceased thought—and they died. But the young children, children not yet mature, were treated with the utmost care. But one child was born in the course of a month in that city of one hundred thousand people. The human race was growing sterile.

And I have told you that they were lonely? Their loneliness was beyond hope. For, you see, as man strode toward maturity, he destroyed all forms of life that menaced him. Disease. Insects. Then the last of the insects and finally the last of the man-eating animals.

The balance of nature was destroyed then, so they had to go on. It was like the machines. They started them—and now they can't stop. They started destroying life—and now it wouldn't stop. So they had to destroy weeds of all sorts, then many formerly harmless plants. Then the herbivora, too, the deer and the antelope and the rabbit and the horse. They were a menace, they attacked man's machine-tended crops. Man was still eating natural foods.

You can understand. The thing was beyond their control. In the end they killed off the denizens of the sea, also, in self-defense. Without the many creatures that had kept them in check, they were swarming beyond bounds. And the time had come when synthetic foods replaced natural. The air was purified of all life about two and a half million years after our day, all microscopic life.

That meant that the water must be. It was—and then came the end of life in the ocean. There were minute organisms that lived on bacterial forms, and tiny fish that lived on the minute organisms, and small fish that lived on the tiny fish, and big fish that lived on the small fish—and the beginning of the chain was gone. The sea was devoid of life in a generation. That meant about one thousand and five hundred years to them. Even the sea plants had gone.

And on all Earth there was only man and the organisms he had protected—the plants he wanted for decoration, and certain ultrahygienic pets, as long-lived as their masters. Dogs. They must have been remarkable animals. Man was reaching his maturity then, and his animal friend, the friend that had followed him through a thousand millenniums to your day and mine, and another four thousand millenniums to the day of man's early maturity, had grown in intelligence. In an ancient museum—a wonderful place, for they had, perfectly preserved, the body of a great leader of mankind who had died five and a half million years before I saw him—in that museum, deserted then, I saw one of those canines. His skull was nearly as large as mine. They had simple ground machines that dogs could be trained to drive, and they held races in which the dogs drove those machines.

Then man reached his full maturity. It extended over a period of a full million years. So tremendously did he stride ahead, the dog ceased to be a companion. Less and less were they wanted. When the million years had passed, and man's decline began, the dog was gone. It had died out.

And now this last dwindling group of men still in the system had no other life form to make his successor. Always before when one civilization toppled, on its ashes rose a new one. Now

there was but one civilization, and all other races, even other species, were gone, save in the plants. And man was too far along in his old age to bring intelligence and mobility from the plants. Perhaps he could have in his prime.

OTHER WORLDS were flooded with man during that million years—the million years. Every planet and every moon of the system had its quota of men. Now only the planets had their populations, the moons had been deserted. Pluto had been left before I landed, and men were coming from Neptune, moving in toward the Sun and the home planet, while I was there. Strangely quiet men, viewing, most of them, for the first time, the planet that had given their race life.

But as I stepped from that ship and watched it rise away from me, I saw why the race of man was dying. I looked back at the faces of those men, and on them I read the answer. There was one single quality gone from the still-great minds—minds far greater than yours or mine. I had to have the help of one of them in solving some of my problems. In space, you know, there are twenty coördinates, ten of which are zero, six have fixed values, and the four others represent our changing, familiar dimensions in space-time. That means that integrations must proceed in not double, or triple, or quadruple—but ten integrations.

It would have taken me too long. I would never have solved all the problems I must work out. I could not use their mathematics machines, and mine, of course, were seven million years in the past. But one of those men was interested and helped me. He did quadruple and quintuple integration, even quadruple integration between varying exponential limits—in his head.

When I asked him to. For the one thing that had made man great had left him. As I looked in their faces and eyes on landing I knew it. They looked at me, interested at this rather unusual-looking stranger—and went on. They had come to see the arrival of a ship. A rare event, you see. But they were merely welcoming me in a friendly fashion. They were not curious! Man had lost the instinct of curiosity.

Oh, not entirely! They wondered at the machines, they wondered at the stars. But they did nothing about it. It was not wholly lost to them yet, but nearly. It was dying. In the six short months I stayed with them, I learned more than they had learned in the two or even three thousand years they had lived among the machines.

Can you appreciate the crushing hopelessness it brought to me? I, who love science, who see in it, or have seen in it, the salvation, the raising of mankind—to see those wondrous machines, of man's triumphant maturity, forgotten and misunderstood. The wondrous, perfect machines that tended, protected, and cared for those gentle, kindly people who had—forgotten.

They were lost among it. The city was a magnificent ruin to them, a thing that rose stupendous about them. Something not understood, a thing that was of the nature of the world. It was. It had not been made; it simply was. Just as the mountains and the deserts and the waters of the seas.

Do you understand—can you see that the time since those machines were new was longer than the time from our day to the birth of the race? Do we know the legends of our first ancestors? Do we remember their lore of forest and cave? The secret of chipping a flint till it had a sharp-cutting edge? The secret of trailing and killing a saber-toothed tiger without being killed oneself?

They were not in similar straits,

though the time had been longer, because the language had taken a long step toward perfection, and because the machines maintained everything for them through generation after generation.

Why, the entire planet of Pluto had been deserted—yet on Pluto the largest mines of one of their metals were located, the machines still functioned. A perfect unity existed throughout the system. A unified system of perfect machines.

And all those people knew was that to do a certain thing to a certain lever produced certain results. Just as men in the Middle Ages knew that to take a certain material, wood, and place it in contact with other pieces of wood heated red, would cause the wood to disappear, and become heat. They did not understand that wood was being oxidized with the release of the heat of formation of carbon dioxide and water. So those people did not understand the things that fed and clothed and carried them.

I STAYED with them there for three days. And then I went to Jacksville. Yawk City, too. That was enormous. It stretched over—well, from well north of where Boston is to-day to well south of Washington—that was what they called Yawk City.

I never believed that, when he said it, said Jim, interrupting himself. I knew he didn't. If he had I think he'd have bought land somewhere along there and held for a rise in value. I know Jim. He'd have the idea that seven million years was something like seven hundred, and maybe his great-grandchildren would be able to sell it.

Anyway, went on Jim, he said it was all because the cities had spread so. Boston spread south. Washington, north. And Yawk City spread all over. And the cities between grew into them.

And it was all one vast machine. It was perfectly ordered and perfectly neat. They had a transportation system that took me from the North End to the South End in three minutes. I timed it. They had learned to neutralize acceleration.

Then I took one of the great space liners to Neptune. There were still some running. Some people, you see, were coming the other way.

The ship was huge. Mostly it was a freight liner. It floated up from Earth, a great metal cylinder three quarters of a mile long, and a quarter of a mile in diameter. Outside the atmosphere it began to accelerate. I could see Earth dwindle. I have ridden one of our own liners to Mars, and it took me, in 3048, five days. In half an hour on this liner Earth was just a star, with a smaller, dimmer star near it. In an hour we passed Mars. Eight hours later we landed on Neptune. M'reen was the city. Large as the Yawk City of my day—and no one living there.

The planet was cold and dark—horribly cold. The sun was a tiny, pale disk, heatless and almost lightless. But the city was perfectly comfortable. The air was fresh and cool, moist with the scent of growing blossoms, perfumed with them. And the whole, giant metal framework trembled just slightly with the humming, powerful beat of the mighty machines that had made and cared for it.

I learned from records I deciphered, because of my knowledge of the ancient tongue that their tongue was based on, and the tongue of that day when man was dying, that that city was built three million, seven hundred and thirty thousand, one hundred and fifty years after my birth. Not a machine had been touched by the hand of man since that day.

Yet the air was perfect for man. And the warm, rose-silver glow hung in the air here and supplied the only illumination.

I visited some of their other cities, where there were men. And there, on the retreating outskirts of man's domain, I first heard the Song of Longings, as I called it.

And another, The Song of Forgotten Memories. Listen:

He sang another of those songs. There's one thing I know, declared Jim. That bewildered note was stronger in his voice, and by that time I guess I pretty well understood his feelings. Because, you have to remember, I heard it only secondhand from an ordinary man, and Jim had heard it from an eye-and-ear witness that was not ordinary, and heard it in that organ voice. Anyway, I guess Jim was right when he said: "He wasn't any ordinary man." No ordinary man could think of those songs. They weren't right. When he sang that song, it was full of more of those plaintive minors. I could feel him searching his mind for something he had forgotten. Something he desperately wanted to remember—something he knew he should have known—and I felt it eternally elude him. I felt it get further and further away from him as he sang. I heard that lonely, frantic searcher attempting to recall that thing—that thing that would save him.

And I heard him give a little sob of defeat—and the song ended. Jim tried a few notes. He hasn't a good ear for music—but that was too powerful to forget. Just a few hummed notes. Jim hasn't much imagination, I guess, or when that man of the future sang to him he would have gone mad. It shouldn't be sung to modern men; it isn't meant for them. You've heard those heart-rending cries some animals give, like human cries, almost? A loon, now—he sounds like a lunatic being murdered horribly.

That's just unpleasant. That song made you feel just exactly what the singer meant—because it didn't just sound human—it was human. It was the essence of humanity's last defeat, I guess. You always feel sorry for the chap who loses after trying hard. Well, you could feel the whole of humanity trying hard—and losing. And you knew they couldn't afford to lose, because they couldn't try again.

He said he'd been interested before. And still not wholly upset by those machines that couldn't stop. But that was too much for him.

I knew after that, he said, that these weren't men I could live among. They were dying men, and I was alive with the youth of the race. They looked at me with the same longing, hopeless wonder with which they looked at the stars and the machines. They knew what I was, but couldn't understand.

I began to work on leaving.

IT TOOK six months. It was hard because my instruments were gone, of course, and theirs didn't read in the same units. And there were few instruments, anyway. The machines didn't read instruments; they acted on them. They were sensory organs to them.

But Reo Lantal helped where he could. And I came back.

I did just one thing before I left that may help. I may even try to get back there sometime. To see, you know.

I said they had machines that could really think? But that some one had stopped them a long time ago, and no one knew how to start them?

I found some records and deciphered them. I started one of the latest and best of them and started in on a great problem. It is only fitting it should be done. The machine can work on it, not for a thousand years, but for a million, if it must.

I started five of them actually and connected them together as the records directed.

They are trying to make a machine with something man had lost. It sounds rather comical. But stop to think before you laugh. And remember that Earth as I saw it from the ground level of Neva City just before Reo Lantal threw the switch.

Twilight—the sun has set. The desert out beyond, in its mystic, changing colors. The great, metal city rising straight-walled to the human city above, broken by spires and towers and great trees with scented blossoms. The silvery-rose glow in the paradise of gardens above.

And all the great city-structure throbbing and humming to the steady, gentle beat of perfect, deathless machines built more than three million years before—and never touched since that time by human hands. And they go on. The dead city. The men that have lived, and hoped, and built—and died to leave behind them those little men who can only wonder and look and long for a forgotten kind of companionship. They wander through the vast cities their ancestors built, knowing less of it than the machines themselves.

And the songs. Those tell the story best, I think. Little, hopeless, wondering men amid vast, unknowing, blind machines that started three million years before—and just never knew how to stop. They are dead—and can't die and be still.

So I brought another machine to life and set it to a task which, in time to come, it will perform.

I ordered it to make a machine which would have what man had lost. A curious machine.

And then I wanted to leave quickly and go back. I had been born in the first full light of man's day. I did not belong in the lingering, dying glow of man's twilight.

So I came back. A little too far back. But it will not take me long to return—accurately this time.

"Well, that was his story," Jim said. "He didn't *tell* me it was true—didn't say anything about it. And he had me thinking so hard I didn't even see him get off in Reno when we stopped for gas.

"But—he wasn't an ordinary man," repeated Jim, in a rather belligerent tone.

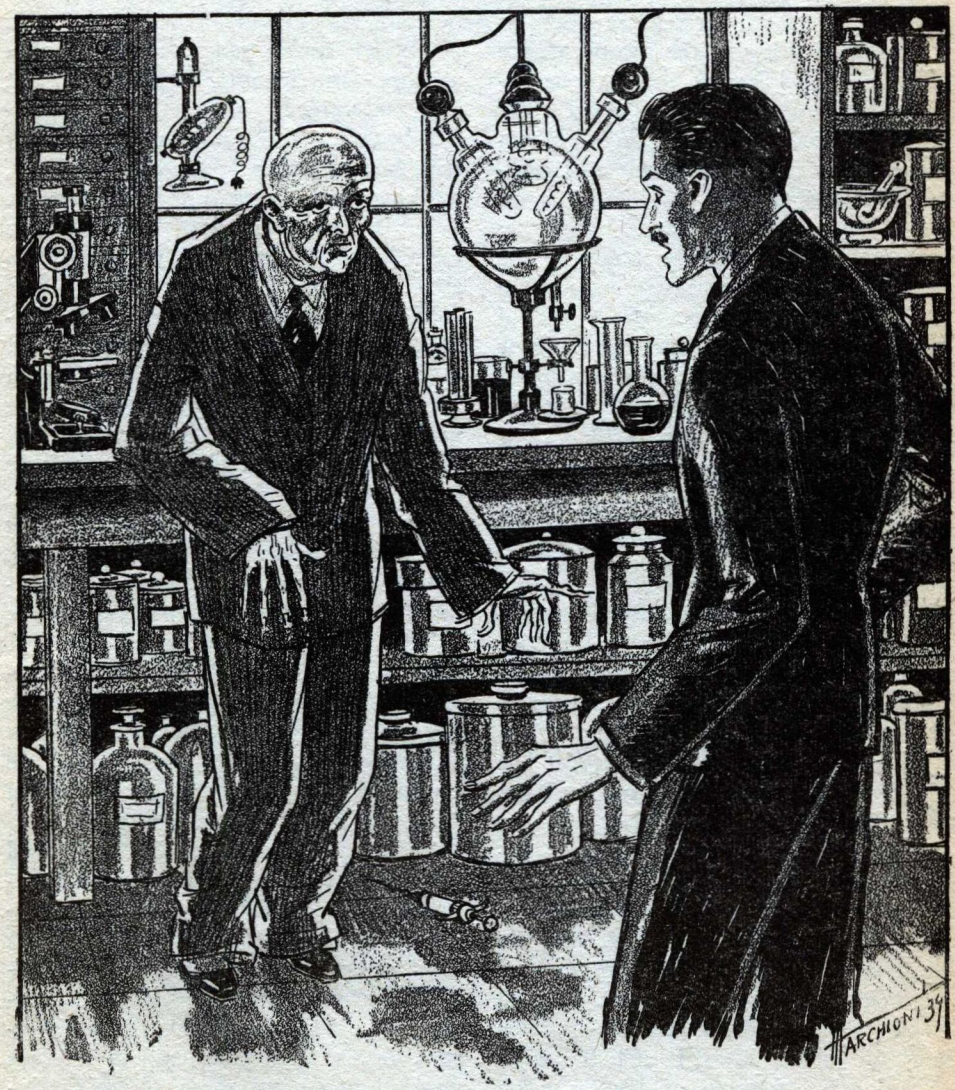
Jim claims he doesn't believe the yarn, you know. But he does; that's why he always acts so determined about it when he says he wasn't an ordinary man.

No, he wasn't, I guess. I think he lived and died, too, probably, sometime in the thirty-first century. And I think he saw the twilight of the race, too.

The Hormone

Illustrated by M. Marchioni

by Dane Milton



Commissioner of Asylums,
State Building,
Albany, New York.

Dear Sir: Let me at the outset beg you not to ignore this communication, as did your predecessors in office. I have long abandoned hope of being released from here, and, indeed, perhaps I shall soon belong here, for the treatment I am receiving is slowly driving me mad. I have heard that you are a young man, a product of the best and

most modern medical schools and more open-minded than older doctors, and so I address this letter to you in the hope that you will consider it seriously.

You probably are familiar with the details of my case, though it was so long ago. You may remember that the police detained me for several weeks as a material witness in the disappearance of Dr. Arnold Breve, the famous research scientist, and that upon their releasing me because of lack of evidence I was adjudged insane and committed to this place.

I tell you I am not insane; I tell you that the story I told the police is the truth. But the papers scoffed, despite Dr. Breve's reputation which should have convinced them I was not lying or mad; and my dear relatives, my loved ones, damn their greedy souls, got me adjudged insane because of that story of mine, got control of the money I would not give them, the indolent worthless louts, and gave a substantial portion of it to the two crooked doctors who declared me crazy. Investigate the records of those two doctors—both were imprisoned for malpractice three years later. Surely that should warrant a reinvestigation of my case. But my story——

Breve and I were close friends, but saw each other rarely, for my business kept me abroad a good deal. In the short intervals in which we were together he would tell me of some new development of his. You know he isolated the causative agent of infantile paralysis and discovered a cure, as well as making many other great medical advances. You know, too, of his later work on hormones. It is of that I want to tell you, of some of his work on hormones that is known only to one man—me.

I HAD just returned from a year abroad and went almost immediately to Breve's house, hoping to induce him to quit his beloved laboratory for a few weeks' vacation. Arnold, that's Breve, opened the door. The first impression I gained of him was that of boundless health. Arnold was always a strong, healthy man, but now he seemed virtually to exude, to radiate, vitality and healthiness. I commented on that and he smiled, saying something which was at that time incomprehensible: "Is it *that* noticeable?"

I broached the question of a fishing trip, but he refused; he was too busy, working on a new line of research. What I soon learned of that research caused me to drop the proposed trip also.

"Do you know anything about hormones?" he asked me without preamble.

"Not much," I admitted. "I have a vague idea that some things by that name wander around in my body, and that's about all. Stock markets and big business are my forte, you know."

He made some derogatory remark about big business which I protested, but he cheerfully waved aside my refutations of his comment and proceeded:

"The hormones are the secretions of the endocrine or ductless glands, ductless merely because their products are emptied directly into the blood stream from the gland. The glands as a rule are small, yet their secretions exert a profound influence upon the body.

"For instance, should the thyroid gland in the neck of a child cease functioning, the condition known as cretinism develops. The child remains a child, never maturing mentally or physically, becomes imbecilic. Regularly inject thyroxine, the product of the thyroid, into such a child and it becomes normal, grows, matures. Cease the injections, and it lapses into its former condition.

"A more familiar example is the 'Islands' of the pancreas, the little glands which produce insulin. Insulin acts as a catalyst in the oxidation of

blood sugar. If it is not present in sufficient quantity, the body cannot burn the sugar in the blood and must get energy by burning fat stored in adipose tissue. As a result, the person becomes thin, though he has an almost constant and raging hunger and, what is worse, sugar is accumulating in the blood. I think you recognize this condition—it is the once fatal illness known as diabetes. Now, thanks to regular injections of insulin, diabetics may live normal lives.

"What I've told you is merely introductory to enable you more easily to understand what I'm working on now. On top of each kidney are other ductless glands, the suprarenals, which produce two hormones. One is epinephrine, better known as adrenalin. The other, well, no one knows definitely what it is or what it does.

"This other hormone is called cortin and is known as the 'vital' hormone. You see, the other hormones are not absolutely essential to life. If no thyroxine or insulin is produced, the individual lives, though he may die in a few months or years. But if the supply of cortin is cut off, death comes in a few days, or even in a few hours. Its absence seems to cause an immediate cessation of all life processes even within the cells of the body, which ordinarily continue some activity for several days after normal death.

"To be brief, I have been examining cortin. I've found, well, you made some comment on my excellent physical condition. That's due to cortin, to the cortin I synthesized."

He stopped. By now I was staring at him eagerly, my original boredom dissipated entirely.

I recovered enough to blurt out: "Have you discovered an elixir of life?"

He was silent for a while. It was obvious he was having difficulty answering. "I do not really know what I have in there," he remarked at last, gesturing toward the laboratory. "In the early stages of my research I isolated a derivative of cortin and injected some of that into my blood. You see what it has done. My senses are sharpened, my vitality is vastly increased. Apparently it improves the health immensely."

"Damn it, man," I exclaimed, "you shouldn't risk your life squirting unknown substances into yourself!"

"There's no danger. I'm fairly sure of that. But come into the laboratory."

Once there, he picked up a small bottle containing a watery, faintly green fluid. "This," he informed me, "is a solution of cortin, somewhat stronger than when found in the body." With mixed feelings I watched him fill a hypodermic syringe and calmly inject the hormone.

My mind was already revolving schemes for establishing a company to sell the hormone as a universal tonic should it be found to affect all persons as beneficially as it had Arnold. I put my hand on his shoulder to speak to him of this and discovered the first definite physical effect of the cortin. His arm, even through shirt and coat, felt warm, unnaturally so. At my suggestion he took his temperature. It was 100.2, one and six-tenths degrees above normal.

Arnold was distinctly surprised. "I feel no different. Certainly I'm not ill." He then measured his pulse rate. That, too, had risen and his blood pressure as well, and both had mounted in the same proportion as had his temperature.

Arnold disparaged my statement that the hormone might be poisonous, and I left feeling reassured.

THE NEXT injection was scheduled for two weeks later. He was looking even more buoyantly healthy, though in all that time his temperature, blood pressure, and pulse rate had continued at the same strangely high level.

The injection was made without mishap. A few minutes thereafter Arnold underwent a physical examination, with results we both expected. His temperature was now 102.8 degrees, blood pressure and pulse correspondingly higher, yet he felt not the slightest discomfort.

It was when we settled down in the library, a half hour later, that I first noticed the change that had come over his physical features since my previous visit. I stared intently at him, but could not decide what it was that had altered, yet with uncomfortable certainty I knew he was different, changed in some subtle manner, in addition to his air of well-being. I made no mention of these thoughts, for I could not point out anything definite. On this occasion I departed, feeling uneasy. I feared for Arnold, without knowing why.

During my third visit I voiced my fears. He scoffed.

"I've changed," he admitted. "But it is a change for the better. Don't be so superstitious. That nonsense about the penalty for meddling with forbidden secrets of nature is just so much rot."

"But what goal are you seeking?" I demanded. "You're blindly experimenting on yourself and waiting for something to turn up. You can't stand these increases in temperature and blood pressure much longer."

"Why not?" he countered. "Perhaps at the same time that it raises my temperature and blood pressure, the hormone so remakes my constitution that the higher temperature and pressure become the natural and proper ones."

Then he fiercely grasped my shoulder and said in a low voice, heavy with the intensity of his emotions: "And my goal—I'm not blindly groping. I'm seeking the chemical compound that governs life, and I know it lies in the hormone cortin. It's my belief that we die when our bodies stop producing that compound. Man, don't you see what that discovery would mean? No disease could kill, nor could old age, for the life-force would ever be present in our bodies!"

He stopped his tirade and glared at me. "Don't you see that no matter what the ostensible cause of death is, there must be one common element in all deaths? And that common element is the cessation of the production of the vital hormone, the life-hormone, the essence of cortin."

He shook the syringe in the air. "It's in here," he shouted, "and I mean to isolate it!" With an angry gesture, he plunged the needle into his arm.

More calmly he put down the syringe and put his arm affectionately around my shoulders. "Perhaps I exaggerated somewhat just then," he said quietly, and then in a whisper as if to himself alone, "and perhaps I did not."

Again I took leave of him, pondering that subtle indefinite transformation in his physical appearance, which had, it seemed to me, increased. I was sure of it, but though I racked my brains, I knew not what it was.

Business prevented me from visiting him for a few weeks. Arnold wrote to me, enthusiastically informing me of the progress of his experiment. He was on the verge of isolating the essence of the cortin. A fourth injection had raised his temperature to the unbelievable height of 105.9 degrees, and his pulse had risen to 118 from the normal 72 per minute. But he insisted that these manifestations of the hormone had produced no ill effect upon him.

WHEN THE DAY arrived for the fifth injection my agitation was almost beyond control. I lay awake at night attempting to discover what it was that was perplexing me, but failed, and came to Arnold's house still much perturbed. He greeted me as usual while I closely examined his face and found that under

the glow of health the pervasive subtle change in his features was even more pronounced, but still nameless and indefinite.

Arnold picked up a small tube with the familiar green liquid. It was much more viscous than formerly, almost jellylike.

"Here," he said, "is the life-hormone itself, in almost pure form. I'm too impatient to proceed slowly as before, and so I shall use this, which is more powerful by far than previous injections. Whatever it does will now occur rapidly and much more visibly."

With growing apprehension I watched him prepare for the injection. The now darker green color of the hormone impressed me unfavorably, why, I did not know. I was still scanning his features, trying to solve the quandary that so disturbed me. As he bent over the table, my eyes fell upon his hair, and sudden realization made me stiffen in fear and terror.

With awful clarity the horrible truth flashed upon me. In one staggering instant came the knowledge of what had been happening to Arnold in the past few weeks. As one who suddenly guesses the solution of a riddle, all the pieces fell together harmoniously. The little lines at the corners of his mouth, the wrinkles at the eyes, the other lines that had appeared in his once smooth firm skin, all confirmed that from which I shrank in horror yet knew to be the truth. And the crowning proof was there before me—in his once raven black hair were flecks of gray, and at his scalp the hair grew white.

Fascinated and paralyzed like a bird entranced by a snake, I saw the needle slip into the vein of his forearm. Then the urgent necessity broke the spell that bound me and I shrieked for him to stop. But too late. The plunger had just descended, and the fatal liquid was driven into his blood stream, irremovably, irrevocably.

Startled by my sudden cry, he demanded to know what was wrong. I could do nothing except point and gasp: "Your hair—your hair."

He stepped to a mirror in wonder, running his fingers through his thick locks. He looked, drew back in surprise. He had seen all I had seen, and he knew what I knew.

He turned to me with a queer light in his eyes, and as he did so a wave of heat came that almost overpowered me—the hormone was taking effect and was raising his temperature far above its highest previous level. I dared not guess to what height it mounted, and none shall ever know.

His scientist's mind grasped even more fully and completely the implications of those many slight changes in his features which had hitherto escaped his notice because of his intense absorption in his work. With a low moan he sank upon a chair, covering his face with his hands.

"So that's the action of the hormone!" he muttered in a strangled voice and shuddered. "I suspected, but did not believe. The hormone—cortin—I know now what it does. Controls metabolism, controls the speed of living—I have speeded up my life. That I failed to see! My apparent healthiness—my vitality being expended at far beyond its normal rate—and that strange fever—that fever, now I know, when it is too late. My body heat pouring forth—years of it in a few weeks! Now years of it in a few minutes!"

A wild laugh shook his body. He stood up trembling. "The hormone—oh, curse the day I began this damned research!" He rocked with insanely hysterical mirth. "I am growing old! In six weeks I have aged fifteen years! In six minutes I shall age forty years! What a gigantic jest of fate!" he yelled. "I sought the secret of life and it kills me! I sought eternal youth, and I

grow older forty years in less than forty minutes!"

He flung out his hands toward me, and they were the hands of an old man, gnarled and wrinkled and skinny. His clothes sank in, deep lines appeared in his skin, rapidly turning the unhealthy brown of old age.

He tottered toward me, and I recoiled from the horror of his face, for gone was the once handsome youthful head, and in its place was the bald skull of a centenarian. His face grew purple as arteries burst under the unbearable pressure; and from him still raged the fierce heat, burning his large body into the emaciated frame of an ancient dotard, consuming his life-energy at that prodigious fatal rate.

With a last despairing moan, he sank to the floor, the wretched life within him stilled.

WHAT happened afterward is yet a confused nightmare. The police came and held me as a material witness in the disappearance of the world-renowned Dr. Breve. What I told them aroused nothing but the greatest disbelief and derision, especially when neither the hormone nor any notes thereon could be found in Arnold's house; and upon my release I was adjudged insane and incarcerated here.

But I tell you that everything I have said is true. I tell you that Arnold discovered how to control the speed of life, but too late, and died of his own handiwork, died of old age thirty-five years after he was born! I tell you that the old, old man found with me in Arnold's laboratory and who now lies in an unmarked grave in the city cemetery is the missing Dr. Arnold Breve, *born 1910, died 1945, at the age of ninety years!*

Elements 91 and 89

An achievement which caps even that of Madame Curie's isolation of radium has been listed to the credit of Dr. Aristid von Grosse, research associate at the laboratories of the Universal Oil Products Company of Chicago, who recently successfully isolated element 91, which is protactinium, next to uranium the heaviest of the ninety-two elements, and similar to but rarer than radium in its properties.

Additional significance is attached to the achievement because of the fact that protactinium disintegrates naturally into element 89, or actinium, itself a hundred and forty times more active than radium. Madame Curie worked for the last two years of her life in an attempt to isolate 89, but was unsuccessful. It has up to now never been seen by man.

Protactinium is so rare that only one part exists in every ten million in pitchblende, the radium-bearing ore. It, and actinium, promise to be exceedingly useful in the treatment of cancer.

Lost Planet

Illustrated by Elliot Dold

by Frank Belknap Long, Jr.

DOWN THROUGH the stratospheric mists the Venusian space rocket plunged with a flame murmur as of Cyclopean furnaces. In the summit observation chamber Flason crouched, his lithe, muscular body tremulous with awe and a kind of exultant triumph.

Though the Earth was new and strange to the little human voyager in the rocket's summit, it was not in all respects an alien planet. As Flason drew near to it he experienced a sense of renewal and rebirth. During the long hours of his voyaging he had dwelt with a kind of intense inward absorption on the past aspects of this aging globe.

Across the desolate wastes of the centuries Flason's little human mind had leaped back, and envisaged populous cit-

ies rising tier on tier to the quiet stars. A vague and primitive reverence for the Earthmen stirred at the back of his mind. For centuries on the planet Venus the Earthmen had been envisaged as crude and savage barbarians, but though the instructors in the Venusian thought-academies had passed on the frail torch of wisdom from generation to generation, always Earthman emotions had tarnished the flame at its crest. There was no pure knowledge on Venus—only Earthman passions mixed with a little imperishable wisdom.

In the dim past a few valiant pioneers had turned their faces from the fierce turmoil of primitive bipeds in their ancient homeland and achieved fulfillment of high, stupendous dreams on the bleak Venusian plateaus and in the depths of sunless valleys. But though the great cities of Venus surged starward in pride, a challenge to the constellations, always the shadow of Earth passions and Earth crudities dimmed the splendor of their triumphs.

All the men and women on Venus were the heirs of the same primitive heritage. The Earth had spawned them, and their biped lineage, their turbulent predatory instincts would not down.

The rocket was piercing the clouds above a long range of purple hills. As Flason manipulated the electro-magnetic retardation disk at his elbow he found himself wishing with a kind of nostalgic regret that he had been privileged to visit the Earth when the mile-high cities were populous; to visit the Earth as an enemy invader. He would have been destroyed, of course, but when Flason dreamed of glory, death was a hazy unreality, a shadow glimpsed but dimly in a misty glass.

Flason knew that for five hundred years the invading Venusian space rockets had succumbed to the ferocities of the envenomed Earthmen. With atomic disintegrators and deadly flame bombs the Earthmen had repelled the invasion by the descendants of the first intrepid colonizers of the smaller planet.

Crude and primitive space rockets had carried the first Earthmen to Venus, but not even the immense, sinister war projectiles of the colonizers could restore their descendants to power on Earth. For five hundred years, Flason knew, the great projectiles had issued from their Venusian berths, pierced the interplanetary gulfs at a velocity of twenty kilometers a second, and hovered high in the stratosphere above the cities of Earth, releasing long green tongues of destruction in the still night. But always from Earth had leaped up the searing challenge of the infuriated Earthmen.

No Venusian war rocket ever returned to its berth. When telescopes of prodigious magnitude, equipped with mist-dispelling ray tubes, were trained on the war areas between the cities and the bleak outlands where no life stirred, flecks of twisted metal which vaguely resembled the destroyed rockets could be distinguished on the mile-wide speculum mirrors.

For five hundred years the Venusians persisted. Then Earth cowardice welled up in them, and the invasions ceased. The cowardice was cloaked with primitive thought evasion and hedged about by sophistry and absurd traditions. The Earth became an accursed solar excrescence—a planet of evil and of death. No one spoke of it. Publicly it was forgotten, ignored.

When an occasional clear-sighted Venusian grew contemptuous of the popular taboos and indulged extravagant dreams of Earth conquest, he was looked upon with suspicion and even loathing. To the inhabitants of Venus the source of all their miseries and frustrations was the Earth and the evil in-

fluence which emanated from it. But it was impious to speak of the matter in public.

FOR THREE hundred years the taboo held speculative thought in check. Then there arose a sprinkling of rebels; embittered and impertinent thinkers who challenged the prevailing mores. Here and there in the great sky observatories telescopes were pointed Earthward again and observations carefully recorded and checked. The revelations of the audacious ones were staggering. The mile-high terraced cities had disappeared from all the continents, the war areas were denuded, and no ships moved on the turbulent dark seas.

The taboos crumbled before the wave of popular enthusiasm which ensued as a result of these discoveries. The inventive genius of the race was stimulated anew, and in the Cyclopean metal forges which dotted the construction centers great flames roared skyward. The new Venusian space rockets vied with the Moon in luminous splendor.

They were equipped with every device known to Venusian science for the surmounting of an alien and malignantly hostile world. Immense electromagnetic space guns lay coiled like malign dark serpents in the metallic grooves beneath their tapering summits, and pale-green heat globes which emitted fiery fields of energy were massed in lethal rows above the dozen projectories which lined the walls of the basal clefts.

Unlike the old war rockets they moved evenly through space, attaining acceleration without parabolic convolutions, and were capable of maintaining a speed of forty kilometers a second through the interplanetary voids. They were shapes of supernal beauty and power, and Flason was proud with an immoderate pride and felt a joyous warmth in his marrow as he sat with his little hairy hand entwined about the gyrostatic pilot bars.

He was the first, he told himself in blissful exaltation, an intrepid space pioneer in the vanguard of a great fleet which would reclaim the Earth as an expansion area for the excess populations of the teeming Venusian cities. And yet as the great rocket plunged Earthward through fleecy cirrus clouds, and he stared downward at the alien and sun-drenched landscape beneath, a paradoxical wave of regret surged over him. If only he could have been one of the war pilots in the dim ages when the Earth's great cities teemed with the dark people, the unregenerate ones, of whom he had heard so much in his dreamy, star-haunted youth. Passing brave *that* would have been—the wild, audacious destiny of a flame pilot above the death-belching war areas, above the proud and barbarous cities.

Still, he was a lonely voyager in space, and that in itself was no mean destiny. And the world beneath him was terrifyingly unplumbed and wonderful, and he was the first, the first. With an odd tingling in his nerves he adjusted his descent suit and pulled the lever which opened the sky door beneath him. The next instant he was falling slowly to Earth, a great billowing mass of air tissue flapping in the breeze above him.

He thought apprehensively of the rocket as he descended. He hoped that it would lodge in an accessible region, in soil of moderate density. If the ground was too soft it might sink from sight, despite the magnetic retardation which he had imposed when it entered the Earth's stratosphere, and the terrific pressure of the terrestrial gas-lifters on its summit which would explode on contact. If the soil was too soft the explosions would not lift its immense bulk above the ground.

His thoughts and emotions were unutterably kaleidoscopic as he swept

Earthward. Beneath him there spread a level plain interlaced with three or four winding watercourses, and far away on the eastern horizon stretched the long range of domed, purple-rimmed hills which he had glimpsed from the rocket. The Earth was a somber gray. No vegetation or sign of human habitation met his gaze as the mass of air tissue descended through the clear air.

His heart was beating immoderately. He looked down at the rough surface beneath, which grew more variegated as he descended. He could soon distinguish tiny boulders, with here and there small dark cuplike depressions in the granular soil. A hundred feet from the ground his eyes widened in surprise and relief.

Immediately beneath him were green and purple flowers—sunflowers, mountain flowers, the wild bushes of Earth. So here was vegetation after all—live, growing things! A wave of gratitude swept over him as he recognized familiar Venusian plants the seeds and spores of which his remote ancestors had carried across the interplanetary gulfs to the black, receptive loam of the Venusian plateaus.

The air tissue settled down in great folds on the moist, dark soil. Flason landed on his back, with a slight shock. He groaned slightly, turned over, and lay still for a moment. Then he got slowly and dizzily to his feet. A sense of profound and bewildering trepidation and alienage rested upon him. It was all so strange—more strange and unbelievable than he had dreamed it could be.

NOTHING untoward had happened. He stood upright upon the solid soil of Earth, a little human creature who had crossed the chill voids between the planets in a long black space rocket. But now that he was at last alone upon the Earth—that strange horrible planet that no Venusian could contemplate without an instinctive shudder—a great awe surged over him.

He stood looking vertiginously about him, dazed by the brightness of the great Sun. The air was unbelievably bright and clear. He shaded his eyes and looked away to the east toward the purple hills. He calculated their distance at five or six miles. About him stretched a level plain, unbroken save for a slight blurring of perspective where it sloped to meet a thin sheet of nebulous blue mist.

Beyond the mist he could discern faintly something dark and glimmering, that looked like a body of water, and beyond that a shape that resembled vaguely a large cube with a smaller cube perched on its summit.

Slowly he began divesting himself of his descent suit. He slipped off the cumbersome metal *twings,* and the loose upper garments of gas-inflated Trilurium. It took him but a moment to undress. He decided that he would need no body covering but the thin inner tunic of burnished Trilurium which encircled his thighs. The Trilurium was sufficiently opaque to protect his sensitive skin from the harsh rays of the terrestrial Sun.

His heart was still thudding as he advanced over the uneven soil toward the swirling mist at the extremity of the plain. His thoughts and feelings were in many respects dominated by a kind of repressed hysteria. His faculties were keyed to a pitch that would have made him an object of suspicion on Venus, where departure from certain emotional norms was thought to merit surgical correction. But fortunately no emotion supervisor was on hand to test his neural responses.

He moved quickly, with a slightly unsteady gait. It was fear that he had to fight—fear of the unknown, fear at being so utterly and appallingly alone. He felt as though he were at the mercy of vast and incalculable forces. Venus

was a remote cold star in space, and he was lost in a hideous world of dead and perishing shadows.

He had advanced about eight hundred feet in the direction of the mist and the gleaming water beyond when the soil beneath his feet fell away suddenly and he perceived that he was standing on the brink of a circular depression in the sloping ground—one of the depressions which his gaze had distinguished when he was descending from the rocket.

For an instant he stood staring downward in a kind of trance. Everything was blurred at first, and he perceived merely flickering congeries of distorted forms both dark and light which seemed to fill the cavity to its rim. Then, suddenly, his vision cleared, and he reeled back in sick revulsion.

Rimming the depression was a circle of shriveled human feet turned upward to the solar glare. In mute horror Flason's gaze swept the withered soles and passed downward to the twisted and distorted bodies which rested head foremost in the pit. The bodies were arranged in a curious way, so that the heads touched and the limbs and torsos radiated outward and upward toward the rim like the spokes of an immense wheel with a depressed hub. The bodies were green in hue, with a metallic sheen.

Something seemed to snap in Flason's brains as he stared. For a moment he reeled at the edge of the pit, his face a livid mask. Then he turned and staggered blindly toward the bluish mist. He passed through it in a frightened daze and came to a shallow body of still, black water.

The water was stagnant and marsh-rimmed. Tall sedge grasses sprouted on its swampy banks, and a few large lily pads floated on the dark surface far out.

Flason did not linger on the margin of the lake. The fright that blurred his faculties drove him forward in a vague, agonized quest. He felt dimly that there was a solution somewhere to the dreadful enigma of the hollow. If only he could find some definite linkage with the familiar, the known—something that would account for the ritualistic ghastliness of bodies disposed of in so abnormal a fashion.

He passed into the water, and the ripples which his movements produced caressed his ankles, his knees, and then his thighs. At one point in the lake the water rose coldly to his chin. He continued to advance and presently found himself on a sloping, boulder-strewn embankment. The Sun was a torment to his eyes, and he was compelled to shade them as he gazed upward at the building before him.

It was a rectangular-shaped structure about forty feet in height, and its perpendicular façade was covered with half-obliterated inscriptions etched on the worn and time-corroded stones. Two slanting obelisks of uncouth dimensions guarded the entrance, which was wide and dark, with crumbling lintels and a sloping porch.

Quickly Flason advanced up the slope and entered the building. Amazement and wonder settled upon him as his gaze swept the interior. The roof had crumbled, and the blazing solar rays poured down on long lines of stone benches set in symmetrical rows. Beyond the benches there loomed an immense white cube which rose twenty feet into the air and shone with a luminosity as of burnished metal.

As the Venusian advanced toward the rear of the building he felt a thrill as of one who draws near to an unplumbed wonder of space and time. The bright luminosity of the cube, its wondrous sheen, fascinated and enthralled him. He forgot for an instant the terror which had sent him stumbling over the ground without and across the black lake to this strange ruin on a malign and desolate planet. Fear still lay in dark

coils at the back of his mind, but the cube was a visible magnet which drew him undeviatingly forward.

THE WHOLE atmosphere seemed surcharged with an abnormal tension as he passed between the long rows of benches and advanced over a smooth area of discolored stone toward the bewildering shape.

He was within four feet of it when the thing happened. The ground beneath him seemed to tilt, and his right foot went from under him. In a frantic effort to preserve his balance he somersaulted backward on the hard stone. When he picked himself up, prismatic lights were flashing on the surface of the cube, and there was a whirring in the air about him.

In dazed bewilderment he looked down to see what had tripped him. His gaze encountered a rounded stone object of peculiar pattern set at an oblique angle in the floor between his feet. Instantly he surmised that the object was some kind of mechanical contrivance and that his collision with it had caused the cube to flicker and revolve. The whirring was increasing, the lights were becoming kaleidoscopic patterns of outlandish shape and texture.

As Flason stared, a chill gripped his nerves, and a dim foreboding began to take shape in his mind. And suddenly as he stood there a human voice spoke in clear, sharp accents. The voice seemed to come from the cube, and the words which it uttered in rapid sequence were partly unfamiliar to the little frightened Venusian.

But in the course of that startling verbal intonation a few words fell with a leaden chill on his faculties, stunning him with their appalling implications. He grew suddenly aware that he was listening to a corruption and distortion of a primitive Earthman language which he had studied as a child in the Venusian thought-academies.

Mixed with many syllables which he recognized, were time-created modifications of old speech-forms, and new syllables so alien that he could not fathom their meaning or significance.

"Wernan listanars un newsen tamples," the voice intoned. "Spazen yellowine vapar sprawden. Herzanton ish molish. Aran chamas efferm crysalashun tandancy unmistak. Vapar produck dap pits by erosun un war aras etween Vladstow an Toko. All bedies sume crysalashun patterons un pits. Ish Specla. Origin vapar un disputen. Bedies maretanus whollen chamical. Vapar maken bedies chamical un pits. Defanses preparens Erope an Atalamis. Natons uniton Erope chamical defanses. Acid chamical defanses effen vapar frum comat mayen saven world. Effen vapar frum Mars oren Venu chamical defanses detanon effen nunnon. Listanars un newsen tamples asken stady picturens effen comen nun defanses regenen send magitic warnenen en chamical stasions."

The voice subsided abruptly and a series of flickering pictures appeared on the luminous cube. The blood drained from Flason's face as he stared at them. He saw low level stretches of land enshrouded in thin mists and pitted as though by some enormous cataclysm. The pits were of varying shapes and sizes, and presently, as his gaze adhered to them, the visual perspective narrowed on the flickering surface of the cube, and he seemed to be hovering in the air directly above the indented areas, gazing down at the little clusters of shriveled human bodies. Some rested head downward, and others were disposed in symmetrical but less distorted attitudes on the margins of the pits.

It was as though some supercosmic architect with a sense of wild, untrammeled beauty, and an utter disregard for the dignity or integrity of his material, had made of human shapes an infernal

visual monument to his arbitrary egoism, his decorative skill.

Turning in revulsion, Flason fled between the crumbling stone benches, and out through the wide door.

As he emerged into the unobstructed solar glare he made a vigorous effort to overcome his mounting emotion. He began marshaling his thoughts into some sort of order, applying discipline to his jarred faculties in an attempt to subdue the swiftly rising terror which flooded his mind. He was virtually certain that he had stumbled on an ancient Earthman place of assembly, where news of world events had been dispensed to a listening congregation.

THE CUBE was quite clearly a kind of televisual device for recording events of significance on all portions of the planet. Flason was familiar with the crude televisual instruments which the Earthmen had possessed at the time of the Venusian colonization, and with the more complex and efficient products of Venusian inventive genius, and the mechanics of the thing did not astonish him.

Apparently it both received and recorded images and announcements, so that a message once received could be stored up and released indefinitely. Some of the Venusian receivers were similar in function, if not precisely the same in structure. What filled him with dread and terror was not the cube, but the ghastly message which it had conveyed.

The curiously shaped stone on the floor of the temple had apparently controlled the mechanism of an old sequence of words and pictures. By stumbling against it he had returned far into the past and had glimpsed the horror as it had loomed in the beginning for the terrified and helpless Earthmen.

Apparently the vapor had been the lethal weapon of some hideous voyager from beyond the solar system. Not from Venus, as the droning announcer had hinted to his appalled listeners, and not from Mars. Flason knew more than the helpless Earthman had known, for the telescopes of Venus were more powerful than those of Earth, and the Venusian had seen the strange dark structures on Mars and knew that they were tenantless beneath the glimmering constellations. Flason knew also that none of the other planets were capable of supporting life in any form.

Obviously then this thing, this horror, had come from beyond the solar system. As he stood blinking in the bright sunlight he found himself wondering with a grim foreboding what manner of thing it was that had destroyed the mile-high cities, and turned the bodies of the Earthmen into chemical horrors.

In deep pits the twisted bodies of the Earthmen bore mute testimony to the effectiveness of the invader's war techniques. The bodies were like crystals in a glass jar on a testing shelf in a Venusian thought-academy—crystals assuming weird and beautiful patterns beneath the manipulations of the Venusian chemists. Were bodies arranged thus in the deep pits of Earth beautiful to this thing, this awful unknown thing from outer space?

As Flason stood trembling in the solar glare before the temple he did not know that he was not alone. It was not until he withdrew his abstracted gaze from the slanting obelisks and carved lintel that he saw the immense dark shadow. For an instant he stared at it in dazed incomprehension. Then slowly he raised his eyes, and as he did so an abyss seemed to open out before him.

The thing towered above with malignly vibrating wings. It was a shape, and yet in some strange, terrible way it seemed wholly shapeless. It was more shadow than substance, and yet it did not lack substance. As he stared up at it there swept over him a

fear so awful that no living creature had ever known the like.

Slowly it bent toward him.

Cold he felt then, unutterably cold, as though he were alone in the black gulfs between the stars, and the thing was watching him there and blowing upon him with its great shapeless mouth.

Lower and lower the thing bent. The fear which rested on the little Venusian's mind was so intense that he could not turn or move or even fling out his arms in instinctive protest. The instinctive urge was present, but his muscles refused to function. He could feel the blood drain from his face. He could feel it suck at his lips and then drain away completely. It was a strange, almost unhuman, sensation.

What followed happened swiftly, in the fraction of an instant. As the great wavering form swept the little Venusian's head, a thunderous detonation shook the Earth, and a long tongue of blinding green flame leaped toward it. The explosion was followed by a whirring noise. It sounded like something rending the Earth in fury.

A frightful screech came from the shadowy form as the flame pierced it. It moved swiftly backward, with a murmur as of a swarm of locusts, and as it did so Flason's knees gave way, and he went down in a heap.

WHEN HE opened his eyes a woman was kneeling beside him. She was slender and pale, with a brave, confident look in her countenance, a wondrous assurance in it, and as Flason stared up at her his eyes widened in startled incredulity. The woman perceived the sudden amazement in his gaze and slowly dissipated it by laying her slim, cool hand on his forehead and addressing him in a level tone.

"We are safe now, Flason," she said. "I killed it with a flame ejector."

She gazed down at him, and her clear blue eyes lighted up. "I am proud to be here beside you, Flason—alone with you in this old home of our race."

Flason raised himself with an effort and looked at her. Wide-browed, clear-eyed, she looked back at him. The corners of her mouth trembled in a kind of serene ecstasy.

The thing was maddening, inexplicable. A woman, a Venusian, here on this desolate, alien planet in space. She put out a hand to restrain him as he started to rise.

"Rest a moment, Flason," she said. "Sit here beside me for a moment. I want to talk to you. I have waited a long time for you to notice me. Even when as a little girl I sat far away from you in the primary thought class under the guide Malharin. You did not notice me then.

"You were a strange boy, Flason, always absorbed in stars and books. You did not even notice me when we sat in the same division in the guide Dargon's laboratory. I was not a little girl then, Flason."

Flason's eyes were riveted on her face. "It's incredible!" he gasped. "How did you get here?"

The woman's face changed. She became suddenly very grave. "I wanted to see Earth," she said. "I am like you in that respect, Flason. I have an eager, inquiring mind, which will give me no peace. I knew that the guides would prohibit passengers on the first voyage, but I was determined to get here. I—I hid myself away in a rear ballast compartment, just under the ether compass. I put on an emergency descent suit and when you dropped through the sky door I crawled swiftly forward on my hands and knees and followed you."

Her voice rose excitedly: "I landed safely and found the rocket, Flason. It's perfectly safe; the ascent mechanism is in perfect order. The combustion lifters have raised it free of the soil. When I

entered it and got out a flame ejector I made a thorough inspection of the basal compartments."

Amazement and wonder were stamped on every line of Flason's face. For several seconds he continued to stare at her. Then he got up and looked quickly about him.

The sunlight was dimming a little on the slanting obelisks and smooth temple walls as his gaze swept the ground in anticipatory dread.

The shape lay sprawled in an amorphous heap at the base of one of the obelisks. It was still horrible in death. Its seared and monstrous wings were drenched with a gleaming yellow ichor, and the outlines of its great body were nebulous with a kind of geometric distortion that seemed dimly to convey that it was still palpitant, still in motion. Several feet away an exploded portable flame ejector rested upright on the sloping soil.

The woman had risen also, and was clutching Flason's arm. "What is it?" she exclaimed. "Do you know, Flason?"

Flason's voice trembled a little. "It is a voyager—an invader," he replied. "I think it came from some distant star cluster, perhaps from beyond the Galactic universe. It and others of its kind came in a hideous vapor that has destroyed the tower cities and all the inhabitants of Earth."

The woman's face had assumed a cast of intense apprehension. "It is like a monstrous bat," she said, with a shudder. "But it doesn't seem quite like anything I have ever seen, like any animal form. Look at it, Flason. It does something to my mind—makes it——"

Flason grasped her arm and drew her quickly away. "There are probably more of the horrible things about," he said. "We must get back to the rocket. Do you know the way?"

Grimly the woman nodded, and together they moved over the dark soil of Earth toward the vast cylindrical shape that had carried them across wide gulfs of space to witness the passing of the little primitive race whose heritage they shared.

A few minutes later the Venusian space rocket pierced the stratosphere with a flame murmur as of enormous furnaces. Flason crouched in the summit observation chamber and gazed with exaltation at the woman by his side.

"I was the blindest man on Venus," he said.

The woman's lips trembled open in tender mirth. "You were always a strange boy, Flason," she said. "Absorbed in stars, and books——"

"They were rewarding enough diversions for a *blind* man," said Flason, with kindling eyes, and as he spoke he bent swiftly sideways and seared her lips with a primitive Earthman caress. For once in his exalted, star-haunted youth the little Venusian was not ashamed of his heritage.

The Great Thirst

A story of the latest scientific discovery, which is death in unscrupulous hands!

by Nat Schachner

Illustrated by Elliot Dold

ALLAN FILLMORE sent his streamlined roadster roaring up the road that went meandering over upland pastures, and braked to a stop before a huge, rambling, barnlike structure on the brow of the hill.

Outside, the sign said neatly: "Sanford Dale, Scientific Consultant." Inside, the converted stables, that had once housed blooded horses in a hundred separate stalls, now hummed with a clutter of strange machines and ordered activity.

Allan's semitutored eye took it all in with a quick approving glance. At the farther end were whirring motor-generators and sparking dynamos, huge, flaring vacuum tubes and a tangle of overhead wires. Great magnets swung from cranes; a De Graaff atom-smasher reared its twin aluminum spheres. Allan recognized the mass spectrograph, the fluorescent screens, the cloud chambers, and all the other impedimenta of a completely equipped physical laboratory.

Segregated to one side was a chemical laboratory, equally detailed, with porcelain sinks, reaction baths, distillation apparatus, spectroscope, thermostat ovens, small electric furnace, and tier on tier of glass-stoppered bottles.

Another corner of the vast chamber was devoted to the biologic sciences, with a row of microscopes that ranged from oil-immersion tubes of normal magnification to the very latest super-electronic television-type delver into molecular constitution itself; agar plates, more ovens, stained sections, innumerable specimens in alcohol, aquaria with fresh-water life and aquaria with saline inhabitants; cages with squealing guinea pigs, white mice, pink-eyed rabbits, and a few drowsy, bemused monkeys.

Allan was astonished. He had not expected anything like this. For there was also a section devoted to mineralogy, with rock crushers of the most approved type, macerators, rolling mills, jigs, slime tables, and gravity stamps. And everything was orderly, shiny, neat, precise. A half dozen men, youngsters mostly, with keen sharp looks, were busy at various tasks.

Fillmore had barely time to complete the most superficial of surveys when a door banged violently open, and a little man hurried into the whirring complex of the laboratory with all the breathlessness of a northeaster.

"Allan!" he cried with glad intonation, hand extended. "But it's good to see you again!"

"And you, too, Sandy."

The tall young man grinned affectionately down at the wizened little man with the sparse sandy hair, watery, blinking blue eyes, clothes baggy and sizes too large for him, and the manners of a tornado. Strangers were always hard to convince that this unimpressive individual was Sanford

The curtain of fire pushed in as though it were an elastic ball, but still it did not break.

Dale, internationally known scientist, and almost the only man of modern times who could truthfully say with Sir Francis Bacon, had he been given to boasting, that he had taken all knowledge to be his province.

Yet, famous as he was, the irresistible combination of his first name, the peculiar sandiness of the few hairs he still possessed, and the general Scotch appearance of his spare form had inevitably fixed on him the name of "Sandy."

By that affectionate diminutive he was known to all and sundry, from the most dignified colleague to the pertest office boy. There is a well-founded story to the effect that the King of England, while presenting him with a medal for certain brilliant researches, so far forgot his wonted reserve as to end his speech, "And so, Sandy, I present you with——" to the sudden convulsions of his learned audience and his own most manifest confusion.

"I didn't expect to find such a complete layout." Young Fillmore waved his hand around the laboratory.

"Nothing much, nothing much," said Sandy. "Just a beginning; my money gave out. But come into my office; there we can talk."

SANDY swept accumulated litter off a chair with a quick movement of his hand.

"Sit down, Allan, sit down," he said.

He whisked a brown bottle out of his desk, produced two small glasses, poured. They drank. He wiped off his close-clipped mustache, sandy also in color, and leaned back.

"Now, tell me——"

Allan looked embarrassed. "Well," he started slowly, "Fillmore Power Co., that is—the old man—that is, I—hang it, Sandy, we want you back with us again."

The watery blue eyes took on sharpness, then filmed again. Sandy shook his head regretfully. "Sorry, Allan, but we've gone over that long ago."

The young man—he had a square determined jaw and the broad shoulders of a fighter—said vehemently: "You've got to, Sandy! Fillmore Power needs you. I don't have to tell you that we're the biggest utility outfit in the world; that research and improvements in our equipment, our service, affect more people than live in half the countries of Europe. Since you resigned, six months ago, we've just marked time.

"To be sure," he continued hastily, "Struthers is competent enough, but he's just a plodder, a laboratory man. He hasn't your—er—imaginative daring, your boldness of speculation, that used to cost us oodles of money, but produced results. You know, Sandy, there's no one can take your place."

The little man smiled. "Plenty, my boy, plenty! For instance, you *could* call back my erstwhile assistant. He has undeniable talents."

Fillmore made a disgusted face. "Orson Munn!! Any man whom Fillmore Power fires, stays fired. He was gunning for your job; carried tales to us behind your back. You know how the old man feels about those things. Now if it's a question of salary, I am authorized——"

Sandy Dale fixed him with reproachful eyes. "Stop right there!" he said. He leaned forward, waggled his finger under the tall young man's nose. "You know the old man, your father, don't you?"

"I've made his acquaintance," Allan murmured.

Sandy glared. "Joe Fillmore's the finest old pirate that ever scuttled a ship. Privately, the best friend I ever had; he'd share his last shirt with the man he likes; he's good to his family, even if it includes such an impossible scalawag as yourself, and he's kind to dumb animals—but as a business man, as Fillmore Power Co., what is he?"

"You tell me." Joe's son grinned.

Sandy took a breath. "A ruthless, cutthroat highbinder, a corrupter of governments, a sweater of labor, a squeezer of the last penny of profit from a suffering public, an—an anti-social being."

"In short, a business man," Allan assented cheerfully.

"Exactly! And that's why I quit and set up on my own. I'm tired of having my inventions and my research utilized, not for the purpose of making life easier and more comfortable for the mass of the people, but to extract still more pennies and nickels and dimes from their pockets into the maw of Fillmore Power.

"Now, for the first time in my life, I'm on my own, free to do the work I want. I am a consultant, but a new kind. I shall conduct experiments and research only for those projects which have a definite social trend, which will directly affect the welfare of people and not add to already swollen fortunes, such as yours."

"I know I'm a malefactor of great wealth." Allan grinned. "Now tell me, Sandy, since you've started, how many commissions have you taken? Paying ones, I mean."

The little scientist looked up mournfully. "None," he said.

"And I'll bet your last cent went into this venture."

"I have enough to pay this week's salaries."

"Exactly! The world isn't interested in hiring research for abstruse social benefits. Only us hard-boiled, penny-pinching business men are willing to pay for results. Come back, and——"

Dale shook his head vigorously.

Allan said impulsively: "Listen, Sandy. Forget the old man and Fillmore Power. You know I have more money than I know what to do with. Let me back you. No strings attached."

The scientist's eyes softened. "You're a decent sort, but I have to refuse. When I *do* get started, it is quite likely that some of my problems will bear adversely on the interests of Fillmore Power, and I prefer to be a free agent."

Allan unfolded his tall frame and stood up. "Sorry! Any time you need help, just yell."

They shook hands. Young Fillmore turned to go, when the door opened, and a startled secretary peered in.

"There's a man out here, Mr. Dale, that——"

"And I'm the man!" a thick gulping voice cried behind the girl.

The next instant she was pushed aside, and a stocky man, roughly dressed, staggered into the office. One hand clutched a quart jar of colorless liquid against his blue jeans; the other was at his throat. His eyes protruded, and his thick lips were dry and cracked.

"Water! For the love of Heaven, a drink of water!" he gasped.

II.

DALE darted to the cooler, drew a glassful, hurried it to the swaying man. It was tossed down in one furious gulp. The blue lips quivered.

"More!"

Allan watched, fascinated, while the man, manifestly a farmer, swallowed four tumblersful without pausing for breath. At the fourth, he wiped his lips, took a deep breath, and the color came back to his weather-beaten cheeks, and his eyes receded normally into their sockets.

"I—I'd most forgotten," he said. "The ride was longer'n I thought. I'd taken no jug along."

Dale's nose quivered like a bird dog's. "I've seen thirsts in my day, but—what can I do for you?"

Fillmore made a move to go.

"Wait, please," Dale said.

The young man sank back into his chair.

"You Mr. Dale, the scientist?" There was disappointment in the farmer's voice.

"I am. I repeat, what can I do——"

"My name's Silas Brent. I got a farm, t'other side o' Armonk, an' there's a pond, spring-fed, from which we gets all our drinkin' water. I got some of it here." He thrust out the capped jar. "I want you to find out what's in it; that is, if it ain't more'n five dollars or so. Times ain't been extra good for us farmers."

"Why didn't you take your sample to the local board of health? They'd be glad to examine it for you for nothing."

"I did," Brent replied, "an' they could find nothing wrong. They sent it to the State department, an' they report the same. But there *is* somethin' queer about the water, 'cause——" His lips started to work queerly again. "Water!" he mouthed thickly.

Dale had been watching him like a hawk. He moved fast.

The man swallowed the brimming glass, wiped his mouth, and went on: "I heard of you in the village, Mr. Dale, so I thought mebbe——"

Sandy said: "What's the matter with your drinking supply?"

"I dunno, excepting that it makes us all-fired thirsty. The more we drank the worse we was. Like dogs with our tongues hangin' out on a hot summer day. We stopped drinkin' it; been living on bottled spring water ever since. It's all-fired expensive, an' we need lots of it. The thirst's been hangin' over, like."

"How long has your pond water acted on you like that?"

"Nigh on two weeks. Afore that it was the best damn drinkin' water in the county."

Allan leaned forward. He was interested now. "Some form of algæ," he suggested, "or perhaps the springs have tapped a saline bed."

Dale looked puzzled, and his nose twitched more than ever. "They have pretty good analysts in the State laboratories. Have you the reports with you?"

"That I have." The farmer fumbled in the pocket of his jeans, produced two very dirty folded sheets.

Sandy glanced through them rapidly, tossed them over to Allan. "Both agree. No free ammonia, no organic contamination; minerals in solution—only traces. Reaction neutral. An excellent potable water, remarks the analyst."

He picked up the jar, stared speculatively at the clear liquid within. "Hello!" he exclaimed. "This jar is heavier than it looks."

Brent drank another glass of water, from the cooler, wiped his lips.

"No; it ain't. Regular fruit jar. That 'minds me o' somethin', now you mention it. I *did* notice it felt almighty hefty in the buckets, an' last week a water-soaked log, what's been in the pond bottom for years, suddenlylike bobbed right up an' floated."

Dale's pale-blue eyes glistened. He almost shouted: "I wonder——"

He was out of the little office like a West Indian hurricane. From outside there came a quick confusion of rasping orders, stoppage of processes, racing feet, and clatter of new movements.

The farmer stared with slack jaw. Had he wandered by chance into a lunatic asylum?

"Hey, Mr. Dale!" he shouted through the open door. "Ain't you gonna——"

Allan grinned and started out. "Come on, Brent. You're just seeing the world's greatest scientist in one of his quieter moments. He's on the trail."

THEY found Sandy measuring out ten cubic centimeters of the water into a beaker on a balance. He took the weight reading, figured rapidly on a

sheet of paper. His assistants were setting up apparatus, tightening joints.

The little scientist glared at his figures and grunted.

"Kin you tell me, Mr. Dale?" Brent started anxiously.

Without moving his head, Sandy snapped: "Shut up!"

Allan had known better than to ask questions in the middle of an investigation.

The farmer moved back, half abashed, half angry.

Sandy raised his voice. "Jenks!"

A laboratory man hurried over. "Yes, sir."

"Forget the distillation apparatus. Take this specimen, put it in an electrolysis bath. Collect the generated hydrogen at the cathode, and get me the weight of a liter at standard pressure and temperature. And, Jenks!"

"Yes, sir."

"I want a report in twenty minutes."

The young man repeated his imperturable "Yes, sir," scooped up the jar with a deft movement, and went away rapidly.

Sandy glanced up, saw Allan watching him quizzically, Brent with slow anger on his face.

Allan said: "Even I know the weight of hydrogen. It's .09 grams per liter."

Dale said heartily: "Quite right. Now let's get back to the office. I want to talk to Mr. Brent, and I think I'll need your help, Allan."

Inside the office, he shut the door carefully behind them.

"Now, Mr. Brent," he said to the sullen farmer. "I've a proposition to make to you. In twenty minutes I'll have a report; until then I'm gambling. Your pond is valueless for drinking purposes; in fact, if what I surmise proves true, its continued use will prove highly poisonous. I am offering to purchase it for ten thousand dollars."

The farmer gulped, started to say something, and only succeeded in sputtering.

Dale misunderstood him. "Not a penny more," he said firmly. "If it were my own money, it would be another matter; but I couldn't think of asking Mr. Fillmore to pay more than that."

Allan jumped. "Hold on, what's this? I didn't say I was in the market for a pond or——"

Sandy twisted his features into a funny little grin. "I'm just taking advantage of your kind proffer of a few minutes ago. It's a grant, a subsidy, if you like, but not for myself. I'll dedicate the damn thing to the public use."

Young Fillmore shrugged. "I'm still completely in the dark, but if you say so——" He took out a pocket check book, unclipped his fountain pen, poised it. "What did you say your first name was, Mr.—er—Brent?"

The farmer stared suspiciously from one to the other. His slow wits fumbled, but greed, cunning, showed in his little red eyes. "I ain't saying," he replied. "And I ain't saying I'm sellin', either. There's somethin' funny about this. You two's all-fired anxious to buy. Why? Must be because that there pond's got somethin' in it's wuth a hull sight more'n ten thousand. Oil, belike, or—or——" Imaginative utterance failed him.

Sandy exploded all over him. "You fool!" he said furiously. "There's no oil or radium or anything like that. It may be just worthless water, and then Mr. Fillmore's stuck. That property isn't worth a thousand ordinarily. At most it would have a scientific value; no commercial value at all. It's for the benefit of science that I'm asking him to gamble; not for his private profit, or mine, or yours."

"Well, I ain't sellin'," Brent declared stubbornly, "until I know just what's in it."

Jenks appeared at the door. He held a slip of paper in his hand. His manner was as imperturbable as ever. "Here is the result, sir."

Dale took the slip, and Jenks vanished.

Dale held it unopened. "Last chance, Mr. Brent," he said, "before I read it. The offer holds good until then."

THE farmer took a step forward; his arm made a greedy half-conscious gesture toward the check book. Then he stopped, and little beads of perspiration started on his seamed forehead. "No, by gorry! I'm just as much of a gambler as you are," he burst out. "I ain't sellin'."

Dale shrugged and opened the paper. Allan watched him breathlessly. The little man's face, usually expressively volcanic, was now a mask. He tossed it to the heir to Fillmore Power.

Allan stared blankly at the figures. "Weight one liter of cathode emanation —.18 grams." How cautious these analysts were! Cathode emanation, indeed!

"Well?" Dale asked after a decent interval.

"I thought," Fillmore returned, puzzled, "that hydrogen weighs .09 grams per liter."

"It does."

"Then this pond isn't—water?"

"But it is."

"How can it be, when there's no hydrogen in it?"

Dale smiled. "It's water, and there's hydrogen. Noticed anything strange about the weights?"

Allan stared at it again. ".18 grams," he read aloud. "That's just double the weight of hydrogen."

"Of *normal* hydrogen," Dale corrected. "We are face to face with the heavy isotope of hydrogen. *Deuterium*, it's been called, and it has only recently been discovered."

Allan gaped again. "Why, then," he cried, "that means the pond is a natural supply of *heavy water*. I read somewhere it cost over——"

The little scientist grinned. "I'll complete your sentence for you." He swung on his first client. "What Mr. Fillmore intended saying, Brent, was that heavy water costs over seventy-five hundred dollars a pound to produce."

That was something the farmer could understand. His jaw dropped wide. "Gorry! Seventy-five hundred a pound!" One could see unaccustomed arithmetical calculations rustily at work in his mind. "An' that's a mighty big pond, too! Why, why——" He turned on Sandy in sudden fury. "So ye was tryin' to cheat me out uv millions, was ye? Why, you little runt, I've a notion to——"

Allan said warningly: "Don't try anything."

Dale chuckled. "You forget, Brent, I said it cost that much to *produce*. Given a large natural supply, the price drops pretty heavily. Furthermore, as I said before, it has no present value in commerce. Its importance for science, however, is immense. Outside of minute quantities taken from Searles Lake in California, it was not known to exist naturally before."

He swung on Brent. "You're taking us over to the pond. Just a minute while I pack some sterile bottles for samples."

III.

BRENT'S POND proved to be a small affair of several acres, cupped in rolling hills. At the southern end, little bubbling movements showed the presence of the feeder springs; a purling brook took care of the overflow.

"I got a four-inch pipe leading down to the house and barns," said Brent. "It was always good, sweet water."

Dale surveyed the crystal expanse. Several dead fish floated on the sur-

face, and the water-soaked log, covered with slimy fungi, rode three quarters out of the water. Otherwise it seemed quite an ordinary pond.

"No doubt about it," Dale said at last. "Checks all around. Fatal to life on prolonged submersion, provokes intense thirst, molecular weight—*heavy water,* in enormous quantities. It wasn't here two weeks ago, and now there's a pond full of it. How did it happen?"

"Perhaps some chemical reaction has been taking place underground," suggested Allan.

Sandy shook his head. "No chemical reaction that we know of will produce *deuterium.* The present method is to separate the minute existent quantities by fractional distillation of liquefied hydrogen. There's something queer about this; more than meets the eye."

He took samples, and they crowded into the roadster again.

"We'll drop you at your house, Mr. Brent," said Allan.

The road swung in a great circle around a hill to reach the farmhouse. Several other farms had first to be passed. The car hummed steadily over the rutted lane.

"Our offer still holds," Dale shouted in the farmer's ear.

He held onto his hat in the rushing wind and yelled back: "Nuthin' doin'! She's wuth more. I'm gonna advertise."

Allan grinned as he swerved the car deftly past a motionless cow, planted solidly in the middle of the lane. "Just another business man."

They roared around a curve at high speed.

"Look out!"

The brakes were good; otherwise there would have been a terrific smash-up. As it was, the roadster skidded and slid in a cloud of dust right up to the bumper of a huge blocking truck. It was parked in the center of the narrow road, filling it from brim to brim.

Allan hopped out with fire in his eye. The driver was standing on the front porch of the weather-beaten farmhouse, back turned to them, talking to a tall thin man in overalls and hip boots.

"That would be old man Pickens," remarked Brent. "Hyare, Jim!" he shouted.

The old man shaded his eyes, and waved greetings. Then, suddenly, he reached behind him into the darkened kitchen, pulled a glass into the open, and drank.

Allan yelled up the path. "Hey, truck driver! What do you mean by hogging the road like that? Pull that scow of yours over to one side."

The driver turned—he was squat and powerful—and made an unmistakable gesture of derision.

Allan purpled and started for the house.

"Just a moment," said Sandy. "I'm coming with you."

His restless peering eyes had taken in the cases of bottled water perched in solid rows on the truck, the name in faded black letters on the side: "Geyser Spring Water Co."

Allan was bursting into furious words when Dale reached him.

He laid a mild restraining arm on his hot-headed young friend. His nose was twitching and snuffing characteristically.

"You should thank the gentleman for compelling us to stop," he said, "instead of bawling him out."

The truck driver stared at him suspiciously. "What you trying to do, runt? Give me the horselaugh?"

"Not at all. Mr. Pickens is a customer of yours for bottled water, I take it?"

"What if he is?"

"Just an interesting fact. Been delivering it long?"

The truck driver exploded. "See

here, fellah, I ain't answering questions, and that's that, see?" He swerved on the wrinkled old man. "That's three bucks an' twenty cents, mister. An' we deliver every Monday."

"I'll pay ye next week," Pickens quavered.

The driver shook his head stubbornly. "Sorry, mister, we ain't allowed. Orders from the firm. This is a cash business."

Brent pushed forward. "If ye ain't got it on you, neighbor, I'll lay it out. This fellow is hard-boiled; he delivers to me, too."

He took out his wallet and laid three dollar bills and two dimes in the man's hand.

The driver grinned. "I didn't recognize you at first," he said. "Water tastes good, huh?"

Brent's lips worked. "You're a bunch o' thieves charging honest men such fancy prices for plain water." He snatched up the glass from the inside kitchen table, tilted the gallon bottle, and drank thirstily.

The driver grunted. "You don't *have* to drink our water, if you don't want to. So long; be seeing you Monday."

He waved airily, stamped off the porch, climbed his truck, kicked the motor into roaring life, and backed warily down the road to a side path, turned in, and went clattering away in a cloud of dust.

"NOW THIS," remarked Sandy, "is getting most interesting. Mr. Pickens, what seems to be the matter with your own water supply? Dried up?"

The old man peered at him nearsightedly. His voice was high-pitched, almost a squeak. "No, sir; it ain't. It's just—I dunno—but since yesterday it ain't fitten to drink. Makes a man thirst like—gosh—like eatin' a barrel o' salt pork and salt codfish mixed."

"Where do you get your water from?"

"From a pool on the side o' the hill there; it's spring-fed."

Brent twisted uneasily, opened his mouth, gulped, opened it again, and blurted out: "I been thinkin', Mr. Dale. Mebbe I was a mite hasty; mebbe if you can't pay more, I shouldn't be the one to be squeezin' ye. Yes, sir; I'm plumb decided; I'll take that ten thousand an' give ye a deed right away."

Sandy chuckled. "I'm not in the market any more."

Cold sweat beaded the weather-beaten forehead. "But, Mr. Dale, you promised—listen, I'll give it to you for nine thousand—listen, I'll be a sport, I'll make it eight——"

"Don't cut your own throat, Brent," Allan advised cheerfully. "You'd better advertise—why, man, there's millions in it!"

Sandy said to Pickens: "Did you call for the Geyser people to come?"

The old man waggled his chin. "Noah, sir. They just pull in here right now, an' ask me if I needed any."

The little scientist whirled on Brent. "And did *you* send for them?"

Brent answered sullenly, his mind still clouded with regrets for the sale he had lost: "No; I didn't. They just came, next morning, like they done with Jim."

Allan's gaze wandered down the twisting lane. It was well off the main highway, and only a few farmhouses nestled between the hills.

"Now what would a spring-water concern be sending a truck to canvass for orders in this out-of-the-way spot?"

Sandy's pale-blue eyes were sharp and bright. "So that strikes you as curious, too? Mind showing me that pool, Mr. Pickens?"

"Not at all."

The old man hobbled down the porch

and led the way up a narrow footworn path toward the crest of the low hill. Last year's leaves had molded into a soft, damp mulch underfoot, and the men made little sound in their upward progress. The trees opened suddenly into a little clearing.

"There she be," Pickens mumbled over toothless gums. "Well, an' what be ye doin' on my property?"

A gushing spring sprang out from under an overhang of rock, filled a natural cistern, and overflowed in a tumbling rivulet that cascaded down the hillside.

Standing on the edge of the pool, motionless, staring down into its quiet depths as though fascinated, was a man. His back was to the newcomers, and evidently he had not heard their approach. He was a big man; tall, heavy-set, every inch as broad-shouldered as Allan himself.

At Pickens' querulous shout, he started, cast a glance over his shoulder, and went plunging into the close-growing trees on the other side of the clearing. In seconds the sound of his thrashing progress was lost.

"Naow I wonder!" the old man gaped. "What did he scare like that fer?"

Allan said grimly: "Didn't seem like a type that would scare easily. Just stood there and looked into the water. Any one get a good look at his face?"

Brent shook his head. "Just gave a perk over his shoulder and ran. Had his cap down over his eyes. By gorry, if he's been putting pizen in our water, I'll be pulling down the old shotgun."

"He wasn't doing anything—now," said Sandy. The little man was evidently excited. "Come on, Allan, there are busy days ahead for me. Let's get back to the laboratory."

They dropped the bewildered farmers at their respective homes and went through Armonk at a sixty-mile clip.

"That fellow up there," yelled Sandy in the teeth of the wind, "he looked familiar to me. Something in the set of his shoulders. Can't place him, though."

Fillmore turned a surprised face and narrowly missed a very indignant woman. She stood out in the road and screeched unintelligible language after their fast-disappearing rear lights. "That's funny," he said, "because I've been puzzling over the same thing. I've seen that bird before, somewhere. If only I had a good look at his face!"

At the entrance to the laboratory, where the neat sign still hung—Sanford Dale, Scientific Consultant—the consultant himself jumped nimbly out of the roadster.

"Thanks, Allan, for your trouble, and for your offer. You see now why I couldn't take it."

Allan stared. "See what?" he demanded. "A five-dollar fee for a water analysis which your client cannily forgot to pay! You'll be starving within a week."

The little man blinked. "Fees? Oh, that! I wasn't even thinking of that. There's a problem here to be solved—a most interesting one—and you're involved; or rather Joe Fillmore, the redoubtable father, is."

Allan stared even more blankly. "Now what the devil do you mean by that?"

It was Dale's turn to show surprise. "Geyser Spring Water Co. is a subsidiary of Fillmore Power, isn't it?"

"Geyser?" Allan echoed. "Let me see. We sold it some three months ago and were glad to get rid of it. Calls for spring water were getting scarcer and scarcer. But what has Geyser got to do with it?"

"That's what I aim to find out."

Fillmore whistled. "A rather crazy layout, but—something tells me there's trouble ahead, so I'll finance your laboratory for the duration, and we'll share any and all profits realized, equally."

Sandy chuckled. "I *do* need money," he admitted. "So you have me on the hip, you young Shylock. Following in your father's ruthless footsteps. It's a bargain, though. Now get busy. Find out who purchased the Geyser outfit from you, and any other information you can dig up. I'll be spending a busy week in the laboratory."

IV.

THE NEXT DAY, when Allan walked into the externally ramshackle structure, he hardly recognized the place. The great laboratories were whirlwinds of motion. And riding the whirlwind ecstatically, himself a minor tornado, was Sandy. His small spare frame wriggled from one end to the other in a sort of gyrating dance; stopping here to blink rapidly into a beaker; there to snap out an order; and farther on to twirl a dial. The little man was in his element.

The dynamos moaned, and the generators growled. Blue lightning sheeted through giant vacuum tubes; sparks leaped the wide gaps between upthrust antennæ.

"What's all the shooting for?" Allan shouted across the din. "Don't you know it's my money you're using now?"

Sandy hurried up, blinking. "Your own fault for getting hooked in a business deal. Did you get the information?"

"Yes; but I'm afraid it's not much good. We sold Geyser through an agent to a man named Miller—August Miller—for a round hundred thousand cash. Never even saw the man. I went to the agent, and he doesn't know him, either. The inquiry came through the mail, and all negotiations went that way also."

"Hmm!" Dale grunted. "The name is obviously a disguise, and the real owner is keeping out of the limelight."

"But I found out other things. Geyser in our hands was a local company. Its water came from a cluster of springs near Pawling, with a total output of about ten thousand gallons a day. Within the past two months the company has been very quietly buying or getting options on all the other bottled-water companies and the springs they control throughout the Eastern seaboard. Furthermore, on the way up, I passed at least ten trucks loaded to the hilt with bottles, delivering all around here."

The little scientist's nose quivered. "The pattern is beginning to piece out. Look at this, will you?"

He dragged Fillmore over to a small galvanometer. The needle was jumping crazily over the dial.

"Well?"

"This neighborhood is saturated with emanations."

"Plenty of radio signals in the vicinity," Allan pointed out. "Also your own apparatus."

Sandy glared. "Don't be a fool! I'm not a child in this sort of thing. I've shielded off every conceivable form of radiation. This is something else—particles, positrons, positive electrons, in enormous quantities. Come over here."

He dragged Allan this time to one of the huge pendent magnets. A long vacuum tube lay parallel to the wire-coiled bar. At the farther end of the tube, inside, was a screen, with dulled surface. Attached to the nearer end was a leaden, funnel-shaped machine. Sandy thrust down a lever.

The machine whirred, but the tube remained dark. The dull screen, how-

ever, burst into a thin perpendicular line of glowing, sparkling pin points.

"The machine is a wave filter," Dale explained. "It cuts out all wave lengths, allows only projectilelike particles to get through—my own invention. They might be electrons, positrons, or neutrons. They're hitting the fluorescent screen, see, and activating it into light. Now I'll turn on the magnet." He thrust another switch. "Look at that!"

The thin line of glittering pin points moved inexorably to the right, almost to the very edge of the screen.

"Positrons, my boy," he snapped. "That's what they are. Electrons would have moved to the left, toward the positive pole of the magnet, and neutrons, having no electrical charge, would have remained where they were."

Allan shrugged. "So that proves there are positrons around. What, if anything, has that do with heavy water?"

Sandy shook his head pityingly. "That's what a university education does for a man. Positrons of a certain voltage will smash hydrogen atoms. Four million volts is more than sufficient. The positron slams its way into the nucleus, and, being equal and opposite in charge to the electron, they both whiff out of existence in a burst of energy. The stripped proton combines with the nearest atom that still holds its excess electron, and, behold, you have a double proton, or deuton, and heavy hydrogen is born."

"But," Allan protested, "wouldn't the same thing happen to any other element?"

"Not unless the voltages were tremendously increased. Helium for instance, next in line to hydrogen, takes twenty-seven million volts, and oxygen a staggering one hundred and fifteen million volts."

Allan said slowly: "I'm beginning to see. Some one, a scientist, has discovered this way of turning drinking water into poisonous heavy water by radiation from a distance. He bought out the Geyser and is on the way to building up a monopoly. The people will have to come to him. Why, there's millions in it, if——"

"Exactly!" Dale nodded. "And there you are. A scientist turned business man, thinking only of his own profit."

"It's not the same," Allan responded heatedly. "We don't try to poison people. They don't have to purchase power from us."

Sandy replied scornfully: "Just the words the Geyser truckman used. People don't have to buy spring water, either. But if their own supplies are polluted, they either do so or thirst. If a man lives in the woods and cuts his own wood for fuel, puts in his own plant, he doesn't have to pay the prices you ask for power, either."

Allan grinned. "I see the point." Then his face hardened. "Nevertheless, what are we going to do about this businesslike scientist?"

"Get him," Sandy said softly. There was a most deceptive mildness to him.

V.

THAT was easier said than done. By the end of the week calamity crashed all along the Eastern seaboard. The unknown scientist had evidently been making tentative experiments, testing out his theories on the obscure farms of Brent and Pickens. Satisfied with the results, he sprayed his emanations over an ambitiously widening area. Boston to the north, Pittsburgh to the west, and Washington to the south, represented the new field of operations.

Uncounted trillions of positrons, charged with four million volts, went hurtling day and night through the etherial lanes. They smashed their way with resistless force into the hydrogen nuclei of every drop of water within

the proscribed area, created deutons, and changed normal life-sustaining liquid into heavy, poisonous, thirst-inducing water.

Tiny villages, comfortable towns, and teeming cities went to sleep after a normal working day with its accustomed groove of labor, domesticity, life, love, laughter, and tragedy, and awoke to find everything seemingly unchanged.

The ponds and the lakes and the reservoirs glistened in the morning sunshine as always, though a small coterie of before-dawn trout fishermen noticed two things: first, that hitherto rushing, leaping, spraying mountain streams now dropped from cascade to cascade in smooth, heavy thudding sheets; second, that some disastrous influence had killed all the fish. High out of the water they rode, their white bellies already a sickly gray, their mouths wide in ineradicable thirst.

Peter Smith, machinist, rose from his nocturnal couch, yawned, looked out the window at the early-morning mist, yawned again, looked down at the still-reposing partner of his joys and woes, saw her parted lips, heard the accustomed little noises that issued therefrom; grimaced, thought of the routine day's work ahead of him, felt a little shiver of rebellion at life in general, and padded to the kitchen to take his accustomed morning drink of good cold water. That brings a man to himself, all right; takes the dark brown taste out of his mouth, makes life once more bearable.

Peter Smith turned on the faucet, let the water run. He filled a glass, tilted back his head, and drank deeply. The first sensation was of heavy weights dropping into his stomach, pounding with thudding blows against delicate linings. Then came thirst, raging, unquenchable thirst, gnawing wolfishly at his vitals.

With little panting cries he ran more water into his glass and drank, seeking to allay this sudden, devouring sensation. Then another, and another, as the great thirst mounted until it became a fiery film that enveloped him and carried him off on beating waves of delirium.

His slattern wife, still sodden with sleep, waddled into the kitchen.

"What's the matter, Pete?" she grumbled.

Her husband clutched his throat with his hands, and his tongue hung thickly.

"Damn water's poisoned!" he forced through thick lips, and dashed down the stairs, barefooted, nightgown whipping around brawny shanks, out into the early-morning street, shouting for a doctor, a policeman, an ambulance, anything that would rid him of his terrible pain.

A great truck lumbered through the cobblestoned street. Painted in faded black letters on the side was: "Geyser Spring Water Co." Perched tier on tier within the open rack were bottles, filled with crystal-clear, tempting fluid.

The driver pulled to the curb at the apparition of Peter Smith, machinist, barefooted, and *en dishabille,* clamoring down the untenanted street, making the morning hideous with his yells. He was not unduly surprised. This was the fifth similarly attired pedestrian he had already met.

"Want some nice drinking water, buddy?" he asked.

Peter Smith skidded to a halt and whispered through rapidly swelling lips: "I'm thirsty; I'm poisoned. Gimme——"

The truckman whisked out a tiny tumbler, half filled it from an open bottle. His instructions had been detailed and precise.

"Try this, buddy," he urged.

Peter gulped down the chary drops, felt a blessed trickle of relief. "More!" he yammered, his mouth gaping like a fish's.

"Five dollars a bottle," grunted the driver.

This was exorbitant, of course; fifty cents to a dollar was the normal market price, but Peter Smith was in no mood to argue fine points about supply and demand. He was dying of thirst; the city water supply had gone haywire, and here was blessed slaking, life itself. The deal was quickly consummated.

As more and more people arose to proceed about their daily tasks, more and more wild-eyed, throat-holding men and women dashed like poisoned rats into the streets of the city, and business overwhelmed the fleets of trucks that had been unleashed on villages, towns, and cities. Within the first half hour, the carefully prepared and hoarded supplies of precious liquid had vanished like the summer snows. There was no more.

TRAGEDY now stalked with terrible stride over the Eastern seaboard. At farmhouses, in the backwoods, off the highroads, no trucks appeared with temporary salvation, and thirst bloomed like an evil flower. Frantic country folk ran from house to well, from well to brook, from brook to pond, from pond to river, urged on by hideous inner fires, drinking, gulping, heaving, thinking in their suffering to find somewhere water that would quench the mounting flames.

Finally, they died on dusty roads and fields, with open mouths and thick-cracked lips, with bloated stomachs and torn intestines; or drowned in ponds and rivers into which they had plunged like maddened animals, in a vain attempt to lap up huge quantities of water for relief.

Even in the cities, the supply of spring water was unequal to the demand. The last bottles on each truck went for fabulous prices. Bankers with upthrust sheaves of bills, tongues lolling out of their mouths, bid hoarsely against each other for the life-saving water, reverted to the beast. Then there was no more.

The streets became shambles. Everywhere men, women, and children ran in foaming circles, spurred on by unutterable torments, finally to drop in distorted little heaps. The bodies lay where they fell.

Jake Crippen swayed through the streets, laughing drunkenly. Every time he came to a sprawled body, he bowed on unsteady feet, pulled the flat brown bottle out of his pocket, uncorked it, tilted it to his lips, swallowed, and blew out noisily.

"Alwaysh knew water drinkin' no good. Look at 'm; look at 'm all! Commsh fr'm not lishenin' t'me. Me, never drink water; thash stuff f'r rivers; not f'r human bein's."

Shouting and singing, he meandered through the ghastly, growing piles, bowing right and left with drunken gravity, and draining innumerable toasts.

By the time warnings had been broadcast from every governmental body, calling on the people to avoid all water until the cause of the strange plague had been discovered, over fifty thousand had died torturing deaths, and hundreds of thousands more were suffering all the horrors of the Ancient Mariner and his wretched companions.

VI.

SANDY DALE had been caught in the midst of feverish, seemingly vain activities. For the entire week his laboratory had been a whirlwind of tests, experiments, sleuthing. Allan had quit Fillmore Power with only a cryptic explanation to his father, and moved bag and baggage—and check book—into the modest living quarters behind the great laboratory.

Sandy tore his few remaining wisps of hair, gnawed at his mustache, littered

his untidy desk with formulae and calculations, threw them away in disgust as soon as he finished; crackled out orders for new experiments, new settings up of apparatus, harried his assistants to the verge of insanity, snapped demands for more and more money, and drove himself harder than any one else.

"We've *got* to find the answer!" he cried to Allan after another test had proved fruitless. "Or else——"

But the answer seemingly was not to be found.

Sandy rumpled his hair and frowned. "I can't understand it. Granted that my experiments haven't shown results in stopping these infernal streams of positrons; granted that I haven't been able to discover a method of resmashing the deutons and breaking them down into normal protons. That might take years of research, failing a lucky fluke. But not to be able to trace the positrons to their source of emanation—*that* is infuriating, worse, it is humiliating!"

"We've tried everything," Allan muttered.

He was red-eyed and worn out with fatigue. Even his iron frame felt the nights and days of ceaseless work. Neither had removed his clothes for an instant; hardly had they taken time to snatch a wink of sleep. Yet Sanford Dale, small and mild and spare, seemed as fresh as a daisy on a particularly dewy morning, and charged with energy as one of his own dynamos.

They made directional tests; took portable apparatus on flying trips to obtain directional angles. The positrons seemed to be spraying indifferently from every point of the compass.

"We are up against a scientist of inhuman attainments." Dale frowned. "Unless," he rumpled his hair again, "it's some unknown natural force."

They made the journey to the springs of the Geyser Co. and found unwonted activity. Trucks rumbled in and out; the operating force had been tripled. More, barbed wire stretched around the buildings, and armed guards ordered callers away. But there was nothing to be seen on which to base any action.

"If only," moaned Allan, "I could place that fellow whom we found staring into Pickens' pond."

Try as they might, however, the vaguely familiar image was singularly barren of identification.

With Allan grimly at the wheel, and Dale crouched to avoid the whipping wind, they roared down the concrete highways to New York.

The terror mounted as they came nearer the metropolis. Poor, thirst-maddened creatures fell almost under their wheels; dogs, rabbits, deer, mice, dashed vainly over the fields, red tongues lolling, age-old enmities forgotten in the common devouring drought; dead bodies lying openly in the suburbs; roaring, shouting, maddened mobs in the streets of the city, smashing into liquor stores, rioting in drunken fury, gutting milk stations for drops of the white liquid; pouring in resistless flood through warehouses of tinned fruit, sucking, mouthing, seeking for anything to quench the intolerable fires within them.

Yet milk and fruits alike were infected with the strange heavy water; only dilution with alcohol seemed to have stopped its insidious inroads. New York was a seething, flaming fury. The last of the spring-water truckloads had been overturned by the mob; half its precious contents spilled from broken bottles into the gutter.

They pulled up at the City Hall. It was barricaded and guarded by police. Discipline alone kept the thirst-ridden men in the ranks. The powerful name of Fillmore made an immediate path for them to the mayor.

They found him in panicky consultation with hastily mobolized scientists, the health commissioner, the chiefs of

the water supply. He was short and stocky, with black, snapping eyes, and a quick slurring tongue. His lips were cracked, and he licked them incessantly.

He threw up his head nervously at the interruption, and saw young Fillmore. He knew him. But Biggs, health commissioner, had eyes only for Sandy, and his worried face lighted up.

"Sanford Dale! Perhaps you can tell——"

"Of course I can," the little man said brusquely.

Within minutes he sketched rapidly what he had discovered; the transmutation of all water into *heavy water;* his suspicions as to the Geyser concern.

The mayor sprang to his feet, pounded on the table. "By Heaven!" he shouted. "We'll arrest every mother's son of them; we'll——"

"Pawling's out of our jurisdiction," the police commissioner interrupted moodily.

"I'll call the governor!" The mayor's hand darted for the telephone.

A MAN pushed his way into the crowded room. He was the mayor's secretary. "A messenger has just delivered this sealed letter to me," he said. "It is addressed to you, Mr. Mayor."

The stocky chief executive waved it aside. "I'm busy now," he snapped. "Let it——"

But Allan had seen the superscription. "Wait!" he shouted. "Before you telephone, better open it. It's from the Geyser Spring Water Co."

The mayor dashed down the receiver, grabbed the missive and slit it open with a quick gesture. His dark round face suffused with red as he ran down the typewritten page.

"By Heaven!" he swore. "The insolence, the colossal nerve of them!"

"Mind letting me read it?" Sandy asked quietly, and took the letter from the mayor's fingers even before permission had been granted. He read:

The Geyser Spring Water Co. is deeply grieved to hear of the unparalleled disaster which has befallen the water supplies of the Atlantic seaboard. For some time our company has felt that the usual sources of drinking water are polluted and a potential menace to the health of the nation, but municipalities and those officials whose duty it should have been to guard the lives of their citizens permitted our warnings to fall on deaf ears.

Now, only too tragically, our prophecies have been justified. Surface water, subject to infection and pollution from every wandering wind, cannot compete with the clear, pure, crystal waters that gush in never-faltering volume from the underground springs controlled by our company. *Our* water is now, as it has always been, uncontaminated and potable.

We are ready, as patriotic citizens, to assist the people of the nation in this great calamity to the best of our power. We wish no man, woman, or child to go athirst.

You no doubt realize that our water is now more precious than gold, more vital than food. We could, if we wished, demand a price commensurate with its importance, but we have no wish to take advantage of your need. In a spirit of humanity, and at a sacrifice of well-established business principles, we are offering you substantial supplies at a very reasonable price, to wit, five dollars per bottle in quantities of a thousand or more.

We must insist, however, on cash payment in advance, and police protection for our shipments.

Respectfully yours,
GEYSER SPRING WATER CO.,
AUGUST MILLER.

The mayor fumed. "The rascals, the butchers! Five times the regular price! I'll be damned if——"

The health commissioner licked his lips furtively. "We've got to, otherwise there won't be a person alive in New York within two days. We can rush through an emergency appropriation to buy a million gallons at once."

The mayor stared into space. His cheeks were wet with perspiration. "I'm afraid you're right, Biggs. They have us by the throat."

And so, by nightfall, with checks for millions of dollars flowing in a great

river from beleaguered villages, towns, and cities, a counterflow of bottled water, potable, thirst-quenching, went by truck and automobile and commandeered trains to a dying populace.

Even as the first appropriation was being voted in New York by a hastily convened board of estimate, Allan started violently and leaned over to Sandy. He whispered a name.

"What a fool I am!" the little man yelled, thereby disturbing the feverish tension of the meeting. "Of course it was he! Come on, Allan!"

Unmindful of the inquiring, startled glances of the embattled officials, they raced out of the room, flung themselves into the roadster, and broke all laws getting back to the laboratory.

VII.

THERE is an isolated mountain not far from the point where three States meet—New York, Connecticut, and Massachusetts. It is not high as mountains go, but it is higher than the surrounding peaks, and it is in a remote part of the Tristate Park where there are no habitations and few people.

Outwardly there was nothing remarkable about the mountain; but high on its wooded slope, underneath a precipitous overhang, an inconspicuous opening led by devious channels into a great cavern.

The cavern was filled with strange machines, humming and whirring and sending off blue crackling sparks. The largest of the machines thrust two aluminum bulbs into the air, and a huge cable, like an ancient serpent, twisted from it into the living rock itself. Men, like gnomes, silent, catfooted, tended the monsters.

Near the entrance two men sat facing each other. One was tall and heavy and sullen-browed. Twisted scorn, repressed anger, glowered on his features. The other was dapper and sharp-faced, and a gardenia perched jauntily in the lapel of his expensive sack coat. But he did not seem particularly jaunty now. In fact, his hand, thin and predatory, trembled nervously.

"Now listen here, Munn," he protested. "I'm willing enough to make money out of this proposition, but I didn't expect it to go so far." He ran his thin hand over a perspiring forehead. "According to latest reports, there are over fifty thousand dead. I—don't like it."

The taller man glowered contemptuously. "You came to me with the proposition, didn't you?"

"Yes, but——"

"You were willing enough to grab my ideas, weren't you?"

"Yes; but I didn't expect——"

"Of course not. You, a big executive, bah!" Orson Munn, scientist and former assistant to Sanford Dale, spat out the words. "You're a weakling, like Fillmore, like all the rest. You like money; you'll kill and burn and torture for it; but it must be by indirection. It must not appear too baldly on the surface; especially, there must be no direct path to yourself. It's the law, the consequences, you're afraid of, Corliss, not the fact itself."

"Oh, come now," John Corliss, alias August Miller, protested. "You can't do——"

"I can't, can't I?" Munn glowered, rising and towering over the shrinking executive. "Now you listen to me. When that idiot Fillmore fired me because of Dale, I set up my own laboratory. You had money, plenty of it, with an itch to make it grow lots more little dollars for you. You came to me for ways and means. Maybe I had invented something you could steal away, like the good business man you are.

"I took your measure at once. But it fitted in with my own plans to have your money at my command. I showed

you the model of my machine for broadcasting positrons at high voltage. I explained the theory of *heavy water;* what its properties were; how you, as a business man, could utilize it. You followed my advice; you bought up the spring-water companies, you watched me install the lead shields that kept them immune from the flying positrons; you could hardly wait for action.

"Now you're afraid. It's become too big for you. Well, you can step out right now. I'll pay you back your investment; the profits will belong to me, and your tender little conscience won't ache you any more."

Corliss started up furiously. "You can't freeze me out. It was my money and half of everything belongs to me. That's the agreement."

Munn sneered. "How about your humanitarian principles?"

Corliss fell weakly into his chair. He mopped his head with a silk handkerchief. "We-ell, nobody has to die of thirst any more. They can buy our water."

"Spoken like a business man," Munn approved.

AT FIRST tankers of water had been rushed to the infected areas from points beyond the range of the positron streams, but several hours exposure caused the fresh supplies to change to the poisonous isotope.

By the time Dale found out that the gallon jugs that Geyser used were made of heavily leaded glass, which stopped the hurtling positrons in their tracks, it was too late to benefit from the discovery. The plague had spread almost over the entire country, and only the fringes were enabled to obtain some measure of relief from outside sources.

Orson Munn's name was placarded in every village and town as wanted for investigation, but he had vanished. The earth seemed to have swallowed him up. Nor could August Miller, the putative head of Geyser's far-flung monopoly, be found, either. Subordinates disclaimed all knowledge of his whereabouts.

VIII.

THE PRESIDENT of the United States declared martial law. It was subversive of the very foundations of the nation, he said, for any private individual or corporation to take advantage of the dire necessities of the people. He issued flat warning to the Geyser Spring Water Co.—charge a fair and reasonable price for your water during the emergency, or the government would forcibly seize and operate the springs.

The company countered by an open letter. It would invoke its constitutional rights. It obtained an injunction from an acquiescent judge. The President removed both judge and injunction. He set twenty-four hours as the time limit for absolute compliance.

The people were becoming dangerous. All their earnings, all the civic moneys that should have gone for education, hospitals, fire and police protection, poured in unending streams into the coffers of the company for the life-giving fluid. Schools and clinics closed for lack of funds; and mobs began to form again. It was only the President's assurance of definite action that kept them from immediate onslaught on the springs controlled by the company.

There was another unexpected by-product of the change that added enormously to the misery of the nation.

There was no rain.

And that was simply explained, once the phenomenon was noted. For the molecules of water in the lakes and streams and rivers and the ocean itself within the circumscribed area were much heavier than they had been, the evaporation processes of course pro-

ceeded at a much slower rate. The result was that the atmosphere lacked moisture, no clouds formed, and the sun shone with full burning darts on parched and thirsty fields. Crops withered and dried; and famine loomed in addition to all other calamities.

Then, too, the dead fish that floated everywhere on the surface of the streams decayed and stank. The dread shadow of plague stalked over the land.

Just before the ultimatum expired, the company answered defiantly. If the springs were seized, it would be found that their value had been destroyed. Only the company knew how to keep them from turning into the universal *heavy water*.

The President grimly ordered the troops to move. There was no resistance. The operating staffs, the guards, had fled during the night. But then it was discovered that the threat had been made good. The springs gushed slowly; they had been transformed overnight into *heavy water*. The protective lead shields had been secretly removed.

A DELEGATION of officials found Dale and Fillmore exhausted with fatigue, but jubilant, in their laboratory. The week since Allan had whispered the name of Orson Munn into Sandy's ear had been hectic.

For Dale had remembered also. Munn had boasted once that, given sufficient funds, he could send any type emanation, whether wave or particle, on curved paths. Immediately thereafter he had been discharged.

Night and day Sandy scribbled mathematical formulae, trying to work out the theory. The De Graaff atom-smasher was pressed into service, and positrons catapulted over measured distances. He used every known method to reproduce deflection—magnets, electrical currents. But always, when the deflecting force was removed, the paths straightened out.

This morning, however, he had an idea. He measured very exactly the electrical charge on the flying positrons. To his astonishment it was slightly greater than the charge on those he himself had manufactured in the laboratory.

The little man whooped as he swung on his partner. "By George, I've got it, Allan."

"What?" asked that weary young man with skeptical intonation.

"How Munn has been curving his streams of positrons so that we can't check back by directional angles to their source. He's superimposed an additional positive charge. The earth is an enormous magnet. The south pole is its negative pole. As a result of the extra charge the streams of positrons, no matter which way they start out originally, feel the pull of the south pole and swerve slightly, but continuously, in that direction. Given the amount of surplus charge, the pull of the earth, the voltage and speed of the electrons, I believe I'll be able to plot their paths back to the point of origin."

In minutes the laboratory was, if that was possible, in an even greater upheaval of activity. Simultaneous tests went on in every part of the great room, with Sandy enthroned before a desk in the center. Men dashed up to him with slips of paper that gave particular results and dashed off again to start a new experiment.

As each set of figures came to him, they underwent lightning transformations under his flying fingers. Mathematical analysis was being pushed to its uttermost limits.

It was into this bedlam of hum and whir and blue flames and formulae that the delegation entered. The mayor of New York was its spokesman.

"Mr. Dale," he blurted out, "we are

at our wit's ends. You've got to do something."

Sandy blinked owlishly. His mind was still teeming with vectors and differentials. "What—what——" he stammered.

"The troops have seized the springs, and they, too, are *heavy water.*"

Sandy made a gesture of dismissal. "That's easy. Order lead screens of at least a foot in thickness to inclose them. That's what Munn used. Now go 'way and don't bother me; I'm busy."

"But——" the mayor started to splutter.

Sandy rose. "By to-morrow morning, if I'm left alone, you won't need the screens. I'll have traced the machine responsible for the emanations to its hiding place. Have a company of soldiers ready to entrain. Orson Munn has reached the end of his rope."

The mayor's dark face showed incredulity. "Are you certain?" he gasped.

Little murmurs rose from the delegation.

"As certain as I can be," Sandy said positively. "Now, gentlemen, please get out. I'm busy."

Without more ado, he plunged into the welter of figures before him.

Allan grinned at the discomfiture of the officials as they hastily backed out of the room, and went back to his own work.

IX

JOHN CORLISS strode agitatedly up and down the length of the cavern. The huge cave swarmed with armed men; they were the guards who had been withdrawn from the springs. Munn watched his erratic movements with a dark sneer.

Corliss stopped in front of him. The gardenia in his lapel drooped and hung askew—a sure sign that he was not himself. "What are we going to do now?" he cried. "The springs have been taken from us."

Munn scowled scornfully. "The springs are no good to them. My machine is still working. By to-morrow they'll be begging us to take them back."

"Why not call it off altogether?" Corliss asked timidly. "I've just figured up. There is left for each of us, after all expenses have been met, over ten million apiece. I'm satisfied."

"*You* may be," Munn pointed out coldly. "Money is all you think of, and your name is not involved. But I am an outlaw. That damned Dale and young Fillmore recognized me when they caught me testing that pool. Besides, there's more to it. Money means nothing to me. I want power, power!" His thick hands clenched. "By the time I'm through, the whole world will be at my feet."

Corliss stared at him uneasily. "See here, I'll have nothing to do with your plans. I'm quitting."

Munn said grimly: "Oh, no; you're not. You're staying. You're in this as far as I am."

The dapper business man quailed. "But they'll trace us here, sooner or later."

"Not even Dale himself could find us. My curved emanations will throw every one off the track."

Almost at the very moment that Orson Munn boasted so confidently of their security, a regiment of soldiers entrained secretly at the Grand Central Station in New York. Their destination was unknown and their departure hidden from public view. They were fully accoutered for battle. Trench helmets sat jauntily on carefree heads, rifles were spick-and-span, light mountain guns rested under concealing tarpaulins on flat cars, and each man had a full complement of hand grenades and gas bombs.

In the forward car were the officers —hard-bitten, skeptical West Pointers—

and Sandy Dale and Allan Fillmore, together with some bulky covered equipment. Though the army men chafed in secret, their orders had come direct from Washington, and they perforce expressed themselves as entirely at the disposition of the little scientist.

He spread out a map of New York State as the train flew through the tunnels and emerged with rocketing speed into the green Westchester fields.

"If my calculations are correct, gentlemen," he said, "the focus of the emanations is somewhere within this area." He pointed to a red circle of some five-mile diameter, drawn in the very center of Tristate Park.

"That is very pretty," the colonel murmured politely, fingering his gray mustache. He studied the map. "It will be quite a hunt."

Allan grinned. "Give Sandy—I mean Mr. Dale—credit, colonel. If Munn's infernal machine is inside that area, he'll spot it within half an hour."

At Copake a fleet of huge inclosed moving vans were waiting. The troops piled in, the backs went up, and the trucks lumbered on State highways to the edge of the forest, then turned into rough roads that climbed steadily higher and higher.

Sandy peeped out, consulted his map. "Halt!"

The truck came to a stop. The long line of following vans shoved on brakes.

"We'll start our tests here," he told the colonel.

A half dozen soldiers helped to unload one of the mysterious pieces of apparatus. It was a directional finder.

Sandy took a reading, scribbled notes. "Now proceed," he ordered. "I want two more readings from different angles."

The rough road became a path, the path a trail, and the van could go no farther. There they took a second reading, and carried the instrument, stumbling and sweating, deep into virgin forest, for the third.

Then for half an hour, while the soldiers unloaded and set up their artillery, Sandy figured and figured. The pencil stopped racing.

He said quietly: "Gentlemen, the angles, after making allowance for induced curvature, converge on a point a half mile due northwest from here and showing an upward angle of thirty-five degrees."

Allan's eyes wandered up the steep, birch-covered mountain in front of them. He saw the precipitous overhang.

"It must be directly under that cliff, then." He pointed. "Why, there's nothing there."

Sandy smiled. "That's because Munn, for all his warped social sense, is a clever man as well as a scientist. The machines are hidden in a cave."

The colonel shrugged. He placed small stock in this hocus-pocus, but orders were orders. So being an efficient officer, he disposed of his troops in a long encircling skirmish line. The battery of artillery pointed wicked snouts upward.

"Well give them a chance to surrender," he said, "if they are really where you say."

A SOLDIER bearing a white flag, climbed steadily up the slope. His form, at first concealed in the thick-clumped birches, emerged, diminished in perspective, on the rubble-strewn gap just below the overhang. His comrades waited grimly below, half hoping his mission would be fruitless, itching for a fight.

Dale and Fillmore did not even glance upward. They were busy unloading the other mysterious bits of apparatus they had taken along.

Suddenly the messenger stopped and waved his flag. They could hear his faint shout. The next instant the horrified onlookers saw his knees buckle,

the violated emblem of peace fall from his hand, and his body pitch headlong to the steep slope, whirl over and over in downward flight, crash into a blockading tree, shudder once, and lie still.

A snarl of rage went up and down the far-flung line. The colonel's face purpled; he snatched out his pocket phone, from which the wires went trailing, snapped out quick-breathed commands. Sandy shouted a restraining protest, but it was too late.

A great cheer rang from the woods, and an olive-drab line surged forward. The ground shook from a salvo of artillery.

Allan's muscles tingled. He stopped work and stared wistfully. "Let me go with them, Sandy," he pleaded. "By the time we get started, they'll have mopped up, and I'll have missed the fun."

"You stay right here," the little man grunted, not pausing an instant. "The colonel is a fool. I told him to wait until I was ready. Munn is too clever to be caught unprepared."

Cries of astonishment burst from the gunners. At a distance of one hundred yards from the concealed entrance to the cave, the hurtling shells exploded in a great smear of flame.

"What did I tell you?" the little man murmured tranquilly.

Allan stared, astounded for a moment, and hurried to help the scientist.

Another salvo detonated, and again the shells exploded against an invisible barrier. The colonel gaped and almost had a stroke. But the first wave of troops had burst into the clearing, and were clambering up the mountain. The sun caught the extended bayonets and tipped them with fire. Up and up they went. A second wave shot out of the woods. It was a race. Nothing showed above; nothing of the strange barrier that had stopped shells at express speeds.

Then it happened.

The first line suddenly halted, staggered, bounced back as if hurled by a gigantic force. Over and over they tumbled, smacking into the second line, bringing half of them down in inextricable confusion. But the survivors, without breaking stride, cheered heartily and went upward at quickened pace.

"Magnificent!" cried Allan, his eyes shining, his heart beating.

"Magnificent, yes!" growled the little man, his fingers still tightening connections. "But not war!"

Straight for the dead line they plunged, shoulders hunched, bayonets extended. Then they, too, went down, rolling and tumbling.

Sandy twisted the last screw, straightened up. "The army has failed; it's up to us now."

X.

WITHIN the cavern, Munn held his hand steady on a switch embedded in the wall. His eye was glued to the eyepiece of a long angling tube that went through solid rock and earth until its inconspicuous lens emerged from the side of the cliff. It was a periscope.

He knifed the switch and turned with a triumphant glower to Corliss, who was trembling as if with ague. "Now take a look, and see what happens."

The no-longer dapper man looked into the periscope. He started violently, looked again.

Then he muttered exclamations in low, awe-struck tones. He tore away, faced Munn with fascinated stare. "Munn," he breathed, "you're a wizard! I didn't believe it was possible. From now on, we are partners in—everything."

Munn snorted. "That's nothing. I have more tricks than that in my bag. This was a simple matter. I increased the positive charge on the positrons heavily and forced them to take a circular orbit around the cave by means of powerful magnets. When the shells

hit the wall of electricity, naturally they detonated; when the soldiers went smashing into it, naturally they got the shock of their lives."

Then his face darkened, even in this moment of triumph.

"But I won't rest easy until I get Dale. Only he could have solved my curving emanations and traced them back here. When he is dead, we shall have nothing more to worry about. The rest of the scientist world are nincompoops, not fit to blacken my shoes."

AT THAT moment Sandy Dale went into action. The snout of his queer-looking machine pointed straight for the cavern opening. It was simple in construction. Two upright tubes of heavy quartz filled with helium, a highly compact electrostatic machine for generating continuous streams of electrons from the helium gas; and an impulse-breaker for emitting them in surges.

The helium glowed into incandescence; the hum of the machine grew to a piercing shriek. The air along the path of the streaming particles glittered with fine pin points of flame. The hurtling electrons crashed with inconceivable velocity into the circling positrons. Positive and negative coalesced and vanished into the substratum of the cosmos. A blinding flare of radiation marked the disappearance.

The great concave arch of the protective curtain took form and visibility as a huge bending sheet of flame. A gasp of astonishment went up from the bewildered troops. The colonel's mouth was agape. Sandy grinned and set the machine up a notch. The whine became almost unbearable. The curtain of fire pushed in as though it were an elastic ball, but still it did not break.

Within the cavern Munn swore furiously. "It's Dale!" he cried, for the first time showing fear.

Corliss cowered, helpless, wilting. The guards, all men with a price on their heads, muttered uneasily. The heat was becoming unbearable.

Munn stepped his own current up to the maximum. More and more positrons went hurtling into the fray.

It was a battle of giants.

The sheeted flame rebounded to its smooth racing curve. Allan groaned. Even outside, the fierce beating power of the released radiations burned like the blast of a steel furnace. The troops had thrown themselves upon the ground, shielding their eyes from the molten vision. Sandy and Allan wore heavily tinted glasses.

Sandy said: "He has plenty of power, but——"

The high piercing note of the machine changed to an unbelievable shriek and then died suddenly.

"Something broke!" Allan cried out in alarm.

"No. The vibrations have simply passed beyond the uppermost limit of audibility. Look up there."

The fiery coalescence of positron and electron had reached white-hot incandescence.

Allan yelled exultantly.

Slowly but surely the victorious electrons were eating up their rivals faster than fresh streams came into the fray, and the visible manifestation of the battle pushed inward in an ever-narrowing arc.

It touched an outcrop of rock, and the rock flashed out of being in a gush of radiant energy.

"They'll die like rats in a trap!" Allan exclaimed. "Give them another chance to surrender."

Sandy switched off the current. At once the positron screen flared back into position and became invisible. The next instant something dropped with a thud into the crouching troops and exploded. Arms, legs, and shreds of flesh spattered high into the air.

Allan turned white. "I'm a fool," he said. "Give it to them, Sandy."

The little man nodded and turned the current on full blast. Once more the curtain flared up; once more it was beaten back, slowly but surely. Back, back against the mountainside! Trees and grass disappeared, then a razor section of soil and gravel whiffed out, showing red-hot rock beneath.

More and more the mountain was shaved away, but still the stream of electrified particles issued from the depths to join the contending forces.

Sandy shook his head in almost admiration. "Fighting to the end," he murmured. "A pity that Munn had a twisted brain."

Then, suddenly, it was over. The impacting flame had either reached the interior source of current, or crisped the operator. The fiery wave surged deep into the ground. The opposition had collapsed.

One last intense flare that almost burned the skin off the watchers, and then it was out. Only an unending stream of victorious electrons was hurtling harmlessly through space, invisible to the eye.

Sandy said "That's that!" and snapped off the current.

The soldiers rose with half-blinded eyes. The colonel stared at the little insignificant-looking man with more than respect; that look held something of awe. Then he turned to the mountain.

A great smoking gash where the cavern had been; the entrails of the giant hill open for their horrified inspection. A seething, still-quivering wound of fire-torn rock.

It was hours before it had cooled sufficiently to permit close inspection.

SOMETHING of sadness was in Sandy's pale-blue eyes. There was no sign in the gaping hole of men or equipment or of the machine that had changed the nation's water to its heavy isotope —just smooth glassy rock.

"Now I'll never know what means he employed to produce such a tremendous outpouring of positrons," Sandy said regretfully.

Allan stared thoughtfully at the ruins. "You still have the worst problem of all to solve."

"What is that?"

"How to change the *heavy water* back to normal potable liquid."

"That requires a zero expenditure of energy. The hydrogen deuton is not very stable. It holds an excess positive charge, because an electron has been torn out of the orbit. When it meets up with a free wandering electron—and there are uncounted numbers always loose—the excess proton grabs it. The two protons and their attendant electrons thereupon part company, and, behold, you have normal hydrogen again. Within a day or two, now that the disturbing flow of positrons is cut off, water will be what it once was."

Allan took a deep breath. "A good many men went to a fiery death in here," he said. "And Orson Munn went with them."

"We're not positive of that," Sandy answered. "We don't know who was in there."

The Earth-men bowed gravely in response.

Outcasts

by Guy Wernham

HEAVILY, wearily, through the stratosphere, the great vessel winged its way. It seemed tired, and its once resplendent hull was battered, dinted by distressful conflicts with the hostile forces of many planets. And now its power, which had once appeared inexhaustible, was running out—devoured little by little through an eternity of light-years.

Two large-headed, slender-bodied Earth-men, survivors of that dauntless army of refugees who had fled from the red, almost heatless, rays of their dying Sun to seek another habitation for their children, were gathered together about him who had been their leader.

He sat as he had sat for days—for weeks—in the control room of the ship, before the instruments that governed

her flight, his gray, deep-set eyes fixed immovably upon the rapidly falling power gauge. Another ten, twenty years—what did such infinitesimal degrees of time matter now?—and their fuel would be burned out.

At one time in the world's history this man and his two companions would have been called old. There was a gray wrinkledness about their skin, and their hair was dead white. But they were not old in the sense of men approaching the end of life. They were ageless.

So had their appearance been for a thousand and one years, and so it would ever be until some physically annihilating catastrophe overtook them. Thus the greater part of their number had already perished; some by accident during the course of perilous adventures on strange planets; others—more recently, this—by their own hand, as they had come to realize the hopelessness of the destiny awaiting them.

Some inexhaustible wellspring of hope had preserved these three survivors from the madness of self-destruction. But now even the emotionless leader, Timiel, was beginning to acknowledge the imminence of oblivion.

"Children," he said in a quiet, passionless voice, "the time has come when we should choose our last resting place."

There was no response from the two watchers.

One of the two, however, seemed not yet to have reached the limit of his capacity for feeling. He stirred restlessly on the cushioned lounge where he was lying and gave vent to a faintly impatient sigh. The old man, though his eyes never wavered from the dial face, seemed to know who had disturbed the watchful silence. A trace of a smile flickered at the corners of his thin lips.

"Ah, Kubal," he said in his soft, old voice, "the ancient passions of Earth smolder yet within you! Do you still resent the inevitable?"

The man called Kubal rolled from the lounge and to his feet in one swift, silent movement. Gray-faced, white-haired like the others, his wide-set, green-gray eyes burned with some indomitable fire of youth. Indeed, were years any longer a criterion of age, he would have been reckoned young compared with the ancient leader.

"This malady of resignation that has fallen upon us is evil!" he cried, his sharp, incisive accents standing out in startling contrast to the smothered tones of the first speaker. "It is destroying initiative, destroying constructive activity, destroying even the will to live! We are answerable to the Great Spirit of the universe for the destiny of these our children."

His outflung arm gestured toward the transparent wall of the control room to another compartment, where were stored row upon row of cells, each containing a precious embryo sleeping in its nutritive liquids.

"We have no right to abandon ourselves thus selfishly," he went on, "as so many of our fellows have done, to the sweets of oblivion, until we are physically incapable of further effort."

A silence followed this challenge. The third man, he who had been Artor the lawgiver on Earth many æons ago, had turned his calm, apathetic gaze upon Kubal while he spoke; but there was no answering spark of rebellion against their fate in his eyes.

Both he and Timiel recognized the ethical truth of what Kubal said, for no man, according to the code of the immortals, had the right to relinquish life while that life might still be of use to his friends. But that particular article of the code they had seen so often violated of late by their despairing companions that it seemed now to have retired among the shadows with the rest of the almost-forgotten institutions of their dead world.

Of what avail was life—of any of

their individual lives—against the menace that now hung over them?

TIMIEL, the leader, for the first time in many weeks slowly turned his head from the recording instruments and confronted his companions. His expressionless eyes met those of the rebellious Kubal and rested there.

"Kubal seeks to inspire us with vain words," he said gently. "The clause in the ethical code of which he speaks was sacred to us once, on Earth, in a life that we have all but forgotten. One by one we have seen our number depleted by those of us who lost faith, who lost contact with the universe Spirit, whose ways are indeed inscrutable. The remaining three of us have stayed on to the end. Why? Was it because we were yet buoyed up by the confidence of ignorance in which we left Earth?"

Slowly the old eyes passed from Kubal to Artor and back again, while the question hung accusingly in the air. It was Artor who at last replied.

"No, Timiel," he said. "We have no hope. I know not what it is that has prevented us from following our companions into oblivion. But this I know—there is no hope of regeneration."

Timiel's eyes wandered again, to meet those of Kubal. "You hear, son?" he asked.

Kubal made another of his impatient gestures. "You are our leader, Timiel," he said. "I still recognize you as our leader, even if such values became arbitrary to our companions who have gone, and to Artor. I shall continue to uphold the principles of our immortal code until my tissues have crumbled to dust. I say you are our leader. Then, Timiel, lead us! Lead us until the immortal life stream is crushed out of you by the ultimate disaster. But that we should resign ourselves thus cravenly to that disaster is evil, Timiel, evil! I am weary of inaction, of this tacit understanding that has arisen among us that we are to abandon effort. Lead us, Timiel!"

Silently Timiel regarded his mentor. Was it, then, still possible that a human could be fired by such passions as seemed to inspire this luckless Kubal? Could it be that he was deliberately blinding himself to——

"I, too, am weary, Kubal," he said gravely. "But weary of action. Weary of hopeless, purposeless, impotent striving against the annihilation that is imminent. For nothing we can do can prevail against that, Kubal. Why should I have to put this into futile words for you? You have been with us, have seen and shared our efforts to establish our civilization upon countless numbers of hostile worlds; have seen us cast forth at length from each—unwanted, death-spreading fugitives.

"Ours is the last of all that mighty fleet that set out, æons ago, so full of hope and confidence from Earth. What has been the fate of our companions, the Great Spirit alone may tell. We have found no world, Kubal, no niche in all the awful vastness of the universes through which we have passed, upon which we could have maintained life without destroying life. Thus far have we obeyed the dictates of the immortal code: 'No man shall destroy life in order that he himself may live.'

"Nowhere have we found the elements wherewith to replenish our fuel power. These died with our world, and I have long been persuaded that they exist on no other. Then, Kubal, what is there left but a passive resignation to the inevitable? Why do you make me tell you this, Kubal, when you must perceive it of yourself?"

"Yes, Timiel; I am aware of these things," replied Kubal. "But I am still so foolish, so blind, as to retain hope. Three men are here, immortally alive and possessed of vast knowledge and experience. There is still time, Timiel, for one last landing—one last attempt

for the survival of our race. What are your intentions, Timiel, what are your plans for that last attempt?"

For the first time in the course of the conversation, Timiel showed signs of distress. His eyes fell before the burning ones of Kubal, and suddenly he buried his face in his hands.

"Kubal," he replied, his thin voice trembling a little. "You know."

"Yes!" The word struck out like a whiplash. "I know. We are to make no further effort to land upon a friendly planet. We are to ride without any objective through space until our last fuel is indeed exhausted, until we come within the sphere of attraction of some passing body and crash senselessly to destruction. Is this indeed your 'plan' for our final landing, O leader?"

Kubal made no effort to disguise the disgust and contempt in his voice. But there came no response from Timiel, beyond a tremor that shook his slight frame. Kubal regarded him for a moment; then he turned his passionate eyes upon the impassive Artor.

"And you, Artor, lawgiver of Earth," he cried, "are you, too, so sunk in this paralyzing inertia of resignation, so utterly demoralized by the mere passage of illusory time and the menace of dwindling power that you are prepared to allow yourself to be wiped out—to die, when no man of Earth has died for thousands upon thousands of years, except by accident? What say you, Artor? Shall we not make one last bid for a permanent dwelling place for our children—one ultimate effort to save our identities from annihilation?"

Coldly Artor regarded him. "Do what you will, Kubal," he replied briefly. "Timiel knows best. Timiel will guide us to sweet oblivion."

THEN KUBAL grew angry, indeed. He turned furiously upon Timiel, flinging out his arm in a gesture that embraced the whole panorama of wheeling worlds and suns mirrored in the viewplate of the magnatelescope.

"White-livered, fish-hearted egotists!" he thundered. "You hear him, Timiel? He, too, still acknowledges you as our leader in his way; and you would lead us to death, as if death were yet some highly prized goal, worthy of striving for, with our sacred mission unaccomplished!

"Ha! Look! Look out, men of clay, upon the vastness, the endlessness of space, upon the infinity of worlds that still lies before us! Forget for a while the greater distance that we have already traveled, the infinitude of planets that we have already attempted. Think only of what still lies ahead, for the shorter journey is of necessity there. Out there is one more planet—one more world for us to choose and attempt. Rather than die like dogs, should we not make this one last effort? What say you, Timiel, our leader?"

The old man raised his head from his hands. Strange phenomenon! Tears were streaming down his dry cheeks.

"Enough, Kubal!" he commanded. "Artor and I are prepared for death. Why can you not relinquish this vanity? In death we shall find the peace that has been unknown—undreamed-of—by immortal man for countless ages. If you cannot still your impossible desires, at least cease from tormenting those who have closed their minds and hearts against everything save oblivion."

"Well, then," shouted Kubal, beside himself with rage at the defeatism in the man to whom he had looked as leader, "since we are to die, and since it cannot matter how we die, let us at least die in my way! Give me at least the satisfaction of choosing the manner of our deaths, Timiel, since I alone of us three seem to be fastidious in this matter."

Timiel contemplated his transported companion with pity. Was this yet another form of insanity induced by the

horror of impending doom? Truly, there had been many whose minds had cracked beneath the strain; but these had taken refuge in suicide, leaping madly from the ship into space.

Wearily, he shrugged his shoulders and gestured vaguely in the direction of the whirling constellations spread out before their eyes.

"As you say, passionate one," he agreed, "there can be little to choose between one manner of death and another. But since you seem to take comfort in the directing of our mutual demise, far be it from me to deprive you of your last pleasures in this life. Choose, Kubal, from the infinity at your disposal, the fortunate planet that you would destine to be our mausoleum."

At these words, delivered though they were in a tone of weary flippancy, the man Kubal was transported with elation. Trembling with enthusiasm, his eyes shining excitedly, he pulled up a stool before the screen of the magnatelescope and pointed out into space.

"It is already chosen, Timiel!" he cried. "For many weeks I have observed this planet. You see? It is green, perhaps a third of a light-year distant."

In spite of themselves, Timiel and Artor were peering curiously over his shoulder, as they had done countless times before; for it had always been the energetic Kubal who had first sighted the innumerable planets they had already visited. Some vestige of a burned-out enthusiasm drew them to his side now, their eyes following the direction of his eagerly pointing finger.

"See, Timiel," he said excitedly. "It revolves about a sun—a great sun in its prime. Certainly it belongs to a solar system very similar to the one we deserted. The spectroscope has already shown me that it has an atmosphere and probably a breathable one. There will be life on that planet, Timiel—perhaps a friendly race with whom we can live in peace, and we shall find not death, but a resting place at last."

Thus it had always been with Kubal. His enthusiasm and optimism were as an intarissable stream, forever leading his companions on from planet to planet, despite the failures that they had come to regard as inevitable.

Even now, in the face of the sluggish inertia to which the awful realization of their dwindling power had reduced them, they crowded behind him with a semblance of animation. But Timiel, whose face had momentarily lighted up as he listened to Kubal, suddenly drooped and sank back with a weary gesture to his erstwhile apathy.

"It is illusion—all illusion," he muttered. "Can you forget that we have come upon many such? Planets so like our old Earth that it seemed more like coming home than making the conquest of a new world? But always our advent has been the forerunner of strife and death, and we have been forced to flee. For," he intoned monotonously, "'No man shall destroy life in order that he himself may live.' It is the law of the code."

Kubal was scarcely listening to him. His ardent gaze was fixed as in a trance upon the green planet as it flashed and whirled on its orbit through space. Always this prospect of a new world would retain this power to thrill and fascinate him. Almost rudely he ousted Timiel from his seat at the controls and began to calculate and direct the ship's course. The others, uninterested now by an oft-repeated program, wandered listlessly away to other parts of the ship, leaving Kubal alone with his dreams.

FOR MANY a long, dreary month Kubal steered the dying ship through space toward the green planet of his desire. Almost forgotten by his companions, who had relapsed into a state of complete resignation and inaction, he

was buoyed up by a great hope. For, as he brought the ship nearer and nearer the green planet, he had been more and more impressed by the resemblance of the system in which it had its orbit to that universe whose Sun had once given life to long-dead Earth. Surely, here would be the long-sought haven!

A day came at last when the ship had approached near enough for Kubal to begin to think of landing on the green planet. Ten, twenty, thirty times he swung around it with diminishing momentum, in ever-narrowing circles, until at last the ship felt the pull of the planet's gravity, and its nose swung sharply downward. Kubal made his landing with the perfection born of a hundred such landings, and the great ship settled down once more, in the midst of a wide, fertile valley over which shone the slanting rays of a setting sun.

Kubal aroused his companions, and the air was soon tested and found breathable. A little too much oxygen, perhaps, but one would soon adapt one's self to that. With Kubal at their head, the little party filed out of the air lock onto the firm soil of the new planet—to Artor and Timiel, a tomb; to Kubal, a heaven of hope.

Timiel, peering about him without enthusiasm, was the first to speak. "It is another Earth," he said. "It is our old Earth as she was in the days of our forefathers. And of a certainty inhabited by a noble, peace-loving race, to whom our arrival will soon spell disaster and death. But this time, Kubal, there will be no return to space. Here you have brought us, and here we shall stay —to die."

But Kubal was busily scratching in the soil with his bare fingers. Bringing up a handful of black loam, he turned impetuously to his companions, who had sunk down on the greensward, the hoods of the robelike garments they wore drawn about the lower parts of their faces. With unseeing eyes, they stared into the rays of the setting sun.

"See, brothers!" cried Kubal. "A rich, fat soil! There is much iron here. Perhaps," he added, his eyes shining with hope, "we shall yet find the elements we need to replenish our power."

Timiel shook his head sadly. "Vain hopes, Kubal," he said. "Can you have forgotten our past experiences so soon? Besides, what if we did find fuel? Are we not weary of space-wandering?"

"Surely!" agreed Kubal. "But given a fresh supply of power, could we not settle here in this fair valley, make our home here? Even with the little power we have, now that we are no longer wasting it on fruitless journeying, it will suffice us perhaps a hundred years. And in a hundred years, who knows? We can give our children to this fair world, Timiel, mortal children, even as our ancestors once were, to multiply and live in happiness by the knowledge that shall be their heritage from us.

"All our store of knowledge shall be theirs, Timiel, save only the accursed secret of immortality. That alone we must withhold from them, for it is not good for men to live forever. That task accomplished, even I would be ready to relinquish my hold on life, and join the Great Spirit. Well? How say you now, brothers?"

For he had become aware that his resigned companions had been listening to this latter speech with some glimmering of interest.

It was the venerable Artor who at last answered him. "What you say is fair enough, Kubal," he agreed. "Some divine inspiration guided you to override our better judgment and bring us to this haven, which is indeed a fair country and worthy of our children. If it be given to us to rest here undisturbed and without harm to whatever race of beings already occupies this planet, it behooves us by the dictates of the im-

mortal code to see to it that our race should not die. Is it not so, Timiel?"

Timiel arose, and bowed gravely in the direction of Kubal. "It is so," he said. "The ways of the Great Spirit are indeed inscrutable. We were resigned to speedy death, but Kubal is right. Even to-morrow we shall set about the task of releasing the embryos and establishing the foundations of a habitation upon this very spot, seeking no farther lest we encounter other beings and bring disaster upon them. Now I recommend that we inject nourishment and sleep. For to-morrow our tasks will me many and wearisome."

At this Artor also rose, and he and Timiel retired into the space ship where they performed the monthly ceremony of injecting subcutaneously the nourishing fluids that constituted their food and assured their immortality. Twelve hours of deep slumber always followed this operation; after which neither food nor sleep were needed for another four weeks.

Soon silence reigned throughout the great ship and out over the valley that was to be the home of a new race. A rising moon replaced the sun with a silvery, ghostly radiance. She shone upon distant hills and grassy plains; upon numbers of two-legged, rabbitlike animals which had come stealing forth to gambol in her rays; and upon Kubal, the pioneer, who had not yet retired, but who sat without gazing over the valley, dreaming.

THROUGHOUT the months that followed, the little party of Earth-men began the establishment of their last colony. The soft, sunny air of the valley shook and roared to the symphony of the vast machines which had been brought from the interior of the space ship. Buildings sprang up almost overnight, built of a metal that they knew how to make from the soil itself. Potent rays delved deep into the bowels of the planet, creating mines whose ramifications burrowed far afield, though never did the Earth-men bring to the surface the precious elements that would have replenished their dwindling power.

And a time came when the embryos, carefully nurtured, had become children—tiny entities that were a constant source of wonder to the Earth-men, for none of them had ever seen children. For countless ages man had been immortal, and the breeding of children had dropped into desuetude. The embryos they had brought with them from Earth had been taken from a great physiological laboratory, where they had been kept alive more out of scientific curiosity than from any idea of permitting them to mature.

These children they carefully reared and trained in every branch of their sciences; taught them the great ethical code of the immortals, which was all the religion they knew; taught them how power—of a sort—might be obtained from the combustion of certain black stones called coal; taught them how to preserve themselves against disease and how to extract food from the soil—such food as men had not eaten for many thousands of years. Taught them—to make an end of cataloguing—how to live as happy, mortal humans had once lived on distant, dead Earth. And slowly their habitations spread out, filling the valley.

THEN one day, into the midst of this haven of the immortals, came the flying cone. It was on a morning when Kubal was instructing some of the boys in the use of the electric plow. Suddenly one of them straightened his back and, shading his eyes with his hand, peered earnestly into the violet mistiness of the horizon.

"See, father," he said to Kubal—for thus the children addressed all the immortals. "Some strange, flying creature

is approaching. Do you see it, yonder?"

Indeed Kubal saw it. His anxious old eyes glared distrustfully upon its rapid approach, for he recognized it as no work of nature, that flashing, whirling cone, but as the product of intelligent beings. Unmistakably, his vast experience told him, here was a flying ship. What menace could it contain? What fresh disaster threatened the children of men?

He became aware that Timiel and Artor had seen the approaching cone and had silently joined him, with more of the children. In the men's hands were strange, new instruments that the children had never before seen and that their father had hoped never again to be obliged to produce. But now there was more at stake than the mere preservation of the immortals themselves. They had brought into this world helpless beings, and now it became their solemn duty to defend them against whatever menace this flying cone might represent.

Rapidly the vessel approached the little colony. Soon it was hovering over them, darting purposefully from point to point over their domain, observing, recording. The silent, waiting men below could see it now as a huge cone of some unknown metallic alloy, its base a whirling disk of flaming, prismatic fire. At last it approached the little knot of grimly awaiting immortals and their trembling children, aghast at this frightening visitation from the void.

It hovered for a moment, then gently descended, the whirling fires at its base dying out, to come to rest at last upon three supports that slid out from beneath it. Far above the heads of the Earth-men it towered, and from its sides eyelike lenses protruded. The immortals were uneasily conscious of a keen, penetrating scrutiny from within. Grasping their weapons more firmly, they awaited in silence.

At last the beings within, satisfied apparently with the results of their inspection, decided to emerge from their craft. A large, round aperture suddenly made its appearance in the vessel's curving side, as a door was opened. Then a sort of gangway, made of the same metal as the rest of the ship, slid forth and came to rest on the ground below.

Figures began to emerge from the interior of the cone—figures the unearthly appearance of which drove the children screaming away, scuttling in terror to the comparative safety of the buildings, while the immortals, accustomed as they were to the strange shapes that life is capable of assuming, raised their death-dealing instruments and waited tensely for the first aggressive movement.

During the course of their evolution, before their world had died, the Earth-men had developed their brains at the expense of their bodies, and their heads were disproportionately large in consequence. But in comparison with the heads of the creatures that were now approaching them from their cone ship, they shrank into insignificance. Huge globes they were, each inclosed in a spherical case of some kind of transparent, crystalline substance and balanced upon three, supple, tentaclelike limbs, terminating in a number of sensitive appendages. These heads were featureless, unless one could call the single eyelike organ, and a pulsing drumhead membrane, features.

Picking their way daintily over the plowed soil with their three tentacles, the creatures advanced toward the Earth-men until they were within a few feet. Then they paused and seemed to be regarding the immortals inquiringly. One slightly in advance of the others extended a quivering tentacle toward them, obviously questioning them through some unknown medium of speech.

Never for one moment taking his eyes from these outlandish visitants, Kubal addressed Timiel:

"What think you, Timiel? They seem to be unarmed and merely curious. Shall we attempt to hold converse with them; or shall we destroy them for the sake of our children?"

At these words there was a wave of agitation among the group of spheres. The Earth-men became conscious of an emanation of force directed against them, as if a silent wind was driving them back.

"Evidently these creatures are of the species sensitive to thought-waves," said Timiel. "They understand the thought of what we say and have erected some kind of barrier between us, against which I feel some doubt as to whether our disintegrators would prevail. We must attempt communication with them. We mean them no harm, as long as they do not harm us."

AS TIMIEL finished speaking, the sensation as of a wind pressing against the Earth-men vanished. The creatures were evidently reassured by Timiel's thought. Again the sensitive tentacles were quivering toward them, obviously trying to establish telepathic contact.

Now the men of Earth had never been able to adapt their organisms to the reception of thought-waves. Some fundamental arrangement of their molecular construction rendered them impervious to the subtle emanations of the ether waves of thought. But they had compensated for this defect, as, during the course of their endless journeyings through space it had become necessary for them to hold converse with creatures on the planets they had visited.

They had perfected a thought-sensitizer which enabled them to become receptive to telepathic communications; and it was toward the laboratory buildings in which these appliances were stored that Timiel now began to lead the sphere-men, conveying to them by his own thought-message that they should follow him without fear.

In the laboratory, Timiel, Artor, and Kubal soon affixed to their heads the metal caps of the thought-receptors and twirled the dials which adjusted the instruments to the thought-wave-lengths projected into them. Almost instantly they felt themselves to be in communication with the sphere-men, whose vibrating tentacles were pouring forth a stream of eager questions and exclamations. The effect upon Kubal was that of a number of people all talking at once, and he held up his hand for silence.

"Let one of you be chosen as spokesman," he projected.

At this there was a short confabulation among the creatures, and at last one of them stepped forward with outstretched tentacle.

"We bring you greetings, men of ancient days," was the message, "and hasten to reassure you that we mean you no harm. You can do us none, for our defenses are many times stronger than your weapons."

This somewhat ambiguous assurance of their safety was received by the Earth-men with mixed feelings. But what had the creature meant by his "men of ancient days"?

"We were not aware," continued the sphere-man, "that anywhere on this planet the course of evolution had been so greatly retarded as your appearance seems to indicate. Thousands upon thousands of ages ago our ancestors were even as you are, so our traditions tell us. We are eager to learn the reasons, if you yourselves know them, for your arrested development and for your sudden appearance in this desert."

Kubal hastened to correct this comic error. He told the sphere-men of the exodus of man from his dying planet; of their endless search through space for a new abode; of the dwindling of

fuel that had menaced them with destruction; and of their final descent upon this planet, where they had found means to form their colony and propagate their race according to their code.

"Your vicissitudes have indeed been far from normal," said the spokesman-sphere. "It is of great interest to us, who are scientists, that certain prognostications of ours concerning the possibilities of a form of life similar to our own having been developed on other planets should be thus dramatically verified. We ourselves have never become interested in space-travel. In fact, the conditions in which we live would prohibit it. For we are a doomed race. It is but a matter of time now before we shall be wiped out as surely as you would wipe out a colony of dangerous microbes. But tell us of yourselves. You breathe natural air? That is astonishing. Once, we are told, our ancestors could breathe free air and live. Indeed, it was essential to their lives."

"It is essential to ours," replied Timiel. "What do you breathe, if not air?"

"We manufacture our own atmosphere," was the answer, "to which during the course of ages our organisms have become adapted."

"But surely," suggested Kubal, "to live in such highly artificial conditions is dangerous? What if your machines should one day fail?"

At this shrewd comment, there was much agitation among the sphere-men. Their tentacles waved violently, and their thought-impulses came through to the Earth-men in such chaos that they were unable to extract any sense from them. At last the confusion died down, and the spokesman again addressed them.

"We have decided to invite you to our city," was the message. "There you may see how we live. You will meet the Triple Brain, and you will learn from him why I say that we are a doomed race."

AFTER some discussion among themselves, the three Earth-men decided that there could be no further danger in leaving the children to their own devices, since they had reached a point where they could look after themselves if need be, and they decided to accompany the sphere-men to their city.

"The atmosphere we breathe," said the sphere-man, when he had heard their decision, "would be poisonous to you. You must provide yourselves with means of manufacturing the atmosphere to which you are accustomed, if you can, and headpieces such as ours to contain it."

"Easily done," replied Kubal. "We have equipment that we provided for venturing into the atmospheres of other planets, and they shall serve us again in your city."

"In that case, there is nothing to delay us. Besides, the contemplation of this busy colony of yours and this unrestricted breathing of free air is distasteful to us. Let us begone!"

The three Earth-men having provided themselves with helmets of transparent material, each of which carried a supply of compressed oxygen and other essential gases calculated to last about a month, nothing remained to be done but inform the children of their intentions and accompany the sphere-men to their conical flying vessel.

Kubal was careful to transfer the thought-receptors to the ship also, for without them communication would have been impossible. During the journey, which lasted several hours, Kubal sought to question the sphere-men concerning their world; but he was politely requested to contain his curiosity until later, when much of interest would be revealed to him and his companions.

Upon arrival at their destination, the Earth-men were bidden to descend from the ship, and they found themselves on a spacious, grassy plain. At first they could see no sign of man's handiwork;

but the sphere-men led the way to a slight rising in the ground, from which, as they approached, the Earth-men could perceive a row of gray metal rods protruding from the soil.

A sphere-man seized one of these rods with a tentacle and pulled on it. A large, circular section of the turf rose up as he did so, revealing itself as the entrance to some subterranean compartment. Before entering this doorway, the Earth-men were bidden to put on their air helmets; then they followed the sphere-men through the hole in the ground and found themselves in an elevator, for, as the door fell to over their heads, they felt the floor sink beneath them with a soft hum of machinery.

The interior was lighted by a phosphorescent radiance that seemed to emanate from the metal of the walls itself. When they reached the bottom of the shaft, the sphere-men removed their transparent air containers, and the Earth-men accompanied their hosts into a vast subterranean city.

Its endless mazes of tubular, corridor-like streets were made uniformly of a gray, radiant metal, and their ramifications seemed to extend many miles into the deepest recesses of the planet. Their guides conducted the Earth-men to a traffic corridor, where they found a string of metal spheres awaiting them. Each of these received one passenger, and the whole vehicle was drawn at lightning speed through constantly lubricated tubes by pneumatic power.

At their destination, the Earth-men were conducted into a vast, circular chamber, evidently some kind of an assembly room. Its curved floor was studded with circles of low, socketlike seats, in each of which reposed a sphere-man.

In the very center of the wide hall were three larger seats, raised on a dome-shaped dais. The occupants of these resembled the rest of the sphere-men in every particular, except that their heads were many times larger than those of their fellows.

As the Earth-men entered with their guides, the assembled spheres, of whom there must have been several thousands, arose to greet them, with the exception of the three in the center, who regarded their approach immovably. The Earth-men, who had donned their thought-receptors, were conscious of a great turmoil of thought-vibrations, which, could it have been translated into terms of sound, would have represented the babel of excited voices.

STRAIGHT up to the three greater spheres the Earth-men were conducted. When they stood before them at last, the three rose simultaneously, briefly extended to the visitors a welcoming tentacle, and then subsided into their sockets. The Earth-men bowed gravely in response. Kubal became conscious of a sudden cessation of the murmur of thought-vibrations about him. Then one of the spheres who had brought them into the hall began to address the three in the center.

"O Triple Brain," he said. "Your minds will already have received most of what we have learned from these visitors. We have brought them before you that they may learn something of us and of the doom that threatens us."

Simultaneously, three tentacles arose from the trinity of spheres and quivered toward the Earth-men, who then noticed that these three were not individuals, but were connected one with the other by thin, fleshy tubes, projections of their epidermis.

"You are welcome here, men from space," said the triple thought-waves, "though, as has been said, you are guests of a doomed race. At one time men of this planet worshiped their ancestors. Then you would have been received as gods."

"Is it then true," eagerly asked Ku-

bal, "that you represent an advanced evolutionary form developed from beings such as we?"

"It is indeed true," was the reply. "Though it is due rather to the artificial conditions of our environment than to the ordinary course of natural evolution that we have become as you see us now. We are works of art rather than of nature. It is to be hoped that your race is never led along the same evolutionary paths."

"Tell us!" entreated the three Earthmen, eagerly.

"MANY thousands of ages ago," began the thought-history, "the scientists of our forefathers had developed their knowledge of the structure of matter to such unheard-of limits that contempt arose among them for the things of nature. They had reached a point where they could produce in synthetic perfection any natural phenomenon. So, in their blind pride, they swore to 'deliver,' as they called it, the race from dependence upon natural things.

"They built this subterranean city, which, as you have divined, has extended through the interior of the planet until little remains of its original structure but a crust representing perhaps a third of its entire volume. They sealed it hermetically against the intrusion of natural atmosphere and proceeded to establish machines to produce artificial air.

"In time they so modified this air that it supplied men not only with the gases necessary to sustain life but with nourishment as well. Food became a thing of the past, for men inhaled their nourishment.

"Then the scientists became arrogant indeed. They set themselves up as dictators in a world that they justly claimed to have created. The people were powerless, for none but the scientists understood the machines which supplied the vital atmosphere. Countless ages went by under these conditions. Gradually men began to change, to become adapted to this artificial environment.

"Since work of any kind had become nugatory, their minds, and consequently their heads—as I see those of you Earth-men have already begun to do—developed enormously, until they became as you see them now. The nutritive air soon dispensed with the necessity for digestive organs; these degenerated and finally vanished, with the whole body structures that existed only to contain them. Something of the same kind is in the course of happening to you, and I divine that you no longer take in nourishment through the mouth. To us, there remained only the heads, limbs, and sense organs.

"Our scientists had been working for many years on the nature of thought-emanations. These they finally found to be ether vibrations to which certain apparatus, such as those which I perceive you are wearing, could be made sensitive. But this did not satisfy the dictator-scientists. After a long period of intensive—and compulsory—grafting and crossbreeding, they finally so altered the very molecular construction of our organisms that we ourselves became sensitive to thought-vibrations without the assistance of instruments. Thus the necessity for organs of speech and hearing became useless, and they decayed.

"Naturally, all this was not accomplished without long years of incredible suffering and misery sustained by our ancestors at the hands of the power-maddened scientists, who had embarked on a veritable orgy of vivisection. The streets of the city were filled with the horrible maimed relics of experiments that had failed. Finally, two events occurred that put an end to the reign of the scientists. By some fortunate accident of birth, we, the Triple Brain, were born, and a discovery was made,

by a tragic error, concerning the nature of our atmosphere.

"We say that the birth accident that produced the Triple Brain was fortunate, for it brought into being a mind-force hitherto undreamed-of by men. Of that later. As to the discovery concerning our atmosphere, it came about in this way: A small group of our people, maddened by the tyranny of the scientists, determined to make their escape from the sealed city and set up a nature colony of their own. They would begin life afresh—tilling the soil for their food, breathing the air of nature.

"They succeeded in evading the watchful eyes of the scientists—or perhaps it was that they were allowed deliberately to escape that their fate might be held up as a terrible object lesson to the rest of the people. For no sooner had they left the city and emerged into the open air than they strangled to death as if by a poisonous gas.

"It was too late. Man could no longer exist in free air. The devilish work of the scientists had so altered the essential constituents of the atmosphere that they had gradually replaced air with an entirely different combination of gases. When this became known, the people were goaded almost to madness. A wave of murder and suicide spread through the city. But nothing could be achieved against the scientists, protected as they were by inviolable defenses. Then it was that the Triple Brain discovered its power.

"Using the tremendous forces of thought, we succeeded in obtaining complete dominion over the minds of the scientists. We drew them forth helpless from their strongholds, and we turned them loose and unprotected from the city into the poisonous atmosphere without. By their own work, they died."

"But although the tyranny of the scientists had thus been brought to an end, men were still dependent upon their machines for life. In the heat of our rage, we had cast the scientists forth to their doom without a thought to the vital knowledge that died with them. But the machines continued to run. They were supplied with vast reserves of atomic power, and on these reserves they have continued to operate for many æons. For some time past, however, we have become aware that the power is dwindling, even as your power dwindled, Earth-men, and not even we have been able to discover the means by which to replenish it. Our race is doomed, indeed. For though we, too, are immortal, without our nutritive atmosphere we shall die."

The Triple Brain fell silent. A strange and tragic history had been revealed to the Earth-men, and for a while they remained lost in contemplation of the fate that awaited these beings, fellow humans despite their inhuman forms.

Then Timiel raised his head abruptly and addressed the Triple Brain. "Your destiny and ours would seem to be tending toward the same end," he said. "For our part, we have been long reconciled to the idea of oblivion, and indeed we count it as a boon worthy of attainment since our duty to our race has been accomplished. We have brought to this planet mortal humans, like unto our forefathers, and we have taught them to live by the soil, even as our forefathers did. They are happy both in knowledge and in ignorance, for inasmuch as we have taught them many things, we have kept much dangerous knowledge from them."

"It is devoutly to be hoped," replied the Triple Brain, "that their evolutionary future will bring them greater happiness than has been reserved for us and you. But you have done well, Earth-men; and you have done what is beyond

our power to do. With us, our race must die; and we, too, are resigned to the prospect of oblivion."

After a short, meditative silence that followed these words, Timiel again spoke his thought to the Triple Brain. "Our work is done," he repeated. "Our children need us no longer, for we have taught them all we know and all that is good for them to know. How say you, brothers? Should we not stay here, to share the fate of this equally exhausted people? Then our passing will not be a source of fear and wonder to the children. Soon our air supply will be gone, and we shall make no more."

Kubal and Artor bowed their heads in silent assent. From the assembled thousands of sphere-men arose a great wave-murmur of approbation that died slowly away to utter stillness.

FAR AWAY in the green, fruitful valley, the children of the immortals lived, toiled, and multiplied. For a while they had wondered and speculated on the fate of their fathers; but soon the immortals were all but forgotten. And their children's children would often come fearfully to peep in breathless wonder at the ruins of the great space ship, whose gaunt, metallic ribs stretching starkly upward remained the sole monument to a great sacrifice.

Statement of the Ownership, Management, etc., required by the Act of March 3, 1933, of Astounding Stories, published monthly, at New York, N. Y., for October 1, 1934.

State of New York, County of New York (*ss.*)

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared George C. Smith, Jr., who, having been duly sworn according to law, deposes and says that he is President of the Street & Smith Publications, Inc., publishers of Astounding Stories, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

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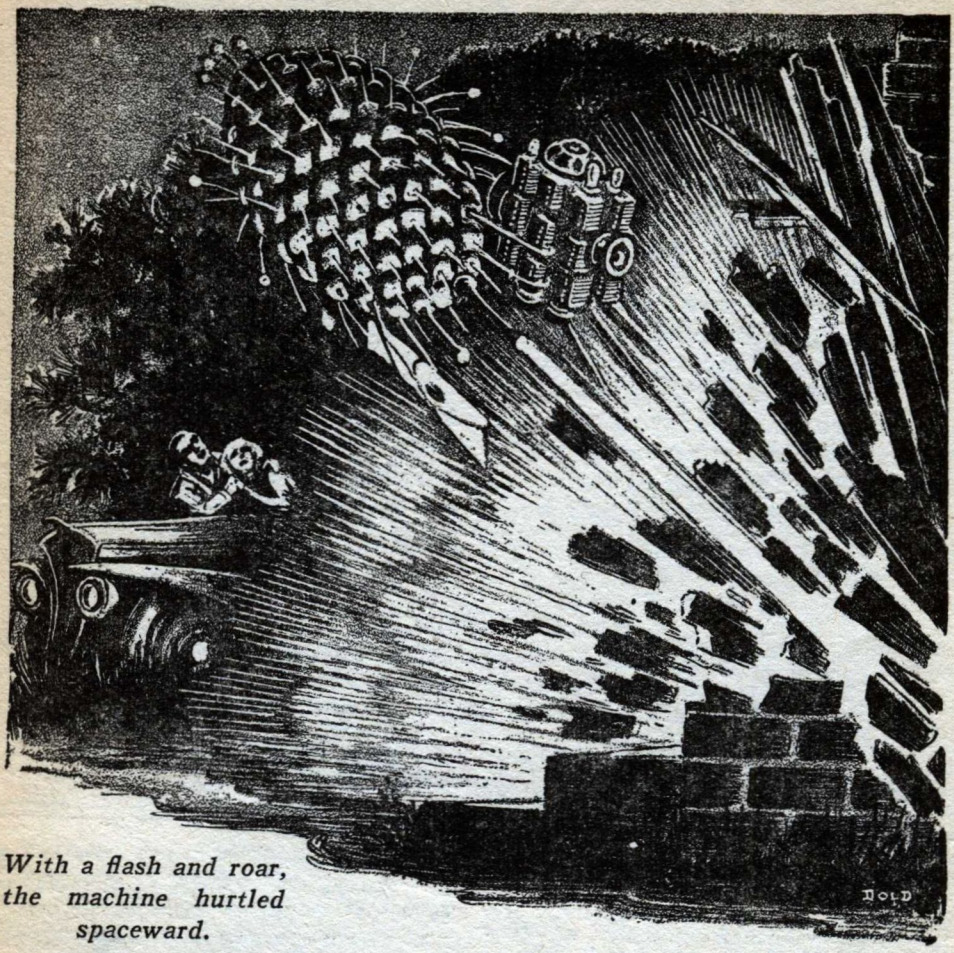
Sworn to and subscribed before me this 28th day of September, 1934. De Witt C. Van Valkenburgh, Notary Public No. 18, New York County. (My commission expires March 30, 1936.)



With a flash and roar, the machine hurtled spaceward.

The Machine from Ganymede

Illustrated by Elliot Dold

by Raymond Z. Gallun

MARKED by four pivotal incidents which wove themselves into a bizarre pattern of sinister mystery, the month of August, 1951, offered its challenge of historical importance to any thirty-one days that had gone before since human culture began.

On the second of the month, Boris Lutkin, brilliant Russian-American savant, announced to an overarmed and conflict-threatened world the discovery

of a weapon so terrible and devastating that it would henceforth make war too unthinkable to contemplate. Lutkin was an ardent pacifist, and he made his motives clear. If war broke out anywhere on the globe, he himself would take steps to force it to a quick conclusion. Except to give a group of scientists, diplomats, and newspapermen, a convincing demonstration of his invention, he of course kept the details of its principle to himself.

The sensation created by Lutkin's discovery was at its height, when on August 5th, something even more startling happened. Astronomers at all large observatories reported queer phenomena happening on, and in the vicinity of, Europa and Ganymede, two large moons of the planet Jupiter.

From near the southern pole of the former satellite, a faint, nebulously luminous wisp arose, and, as the hours passed, drifted almost imperceptibly, though certainly at a speed of several miles a second, toward Ganymede.

When it had arrived to within a few thousand miles of its goal, a similar smoky wisp oozed out of the Ganymedean desert. The two clouds seemed to rush together and coalesce. Tiny threads of lemon-yellow light darted and played wickedly in the joined mass for nearly five hours, until its substance faded from sight, seemingly lost over the satellite's surface, or passing into its interior.

The significance of this interplanetary happening? No one, of course, could offer an absolute and irrefutable explanation, and yet one view was accepted in lay and scientific circles almost without question. What did those wispy, luminous clouds suggest? Huge, alien armadas shining by the reflected light of the sun? Were those darting threads of yellow light produced by unknown and incredibly powerful engines flashing out destruction?

There was so much which the abyss of hundreds of millions of miles left concealed! And yet these seemed to be the most reasonable answers to the riddle, which could not be explained by any known natural phenomenon. The civilizations of Ganymede and Europa, then, were engaged in some titanic death struggle.

Though interplanetary travel was regarded as being a future certainty, Earth was still an isolated sphere with no contacts with its neighbors except those offered by optical instruments, more powerful, it is true, than those in use two decades before; but as yet inadequate to probe in much detail the vastness of space.

Men had watched with growing interest such things as the seasonal changes of the canals of Mars and the melting of her icecaps; they had wondered about the nature of the great red spot of Jupiter; their fancies had sought to penetrate beneath the veiling vapor-blanket of Venus, attempting to picture what lay hidden there.

Much data was at hand, giving vague hints of the unexplored wonders of other worlds; but never before had any sign from the void been so tantalizingly suggestive of distant intellects at work as the Europa-Ganymede incident.

Its effect upon the human race was what one might expect. For years people had been becoming space-conscious, and now a kind of hilarious emotional spasm seized them. Bands played and impromptu parades were formed. Crowds cheered and shouted for more information. Nor were their emotional outbursts the product of joy alone. There was a dim, soul-tweaking element of danger, too, which they sensed or imagined.

Their feelings were not so very different from those which dominated the incipient stages of great international conflicts of the past. Men could not look into the star-shot sky of evening without being touched by a cold tingling

thrill, either of fear or of adventure, according to their individual temperaments.

Two far-off worlds, peopled by creatures who were almost certainly not human in form, since mankind is but the accidental product of the terrestrial environment, were at each other's throats. Suppose that, reveling in conquest, the victors should choose to blaze a path across the etheric desert to Earth, extending their dominion to a younger, less learned sphere? Science remembered that life in every known form is predatory, competing ruthlessly with other forms of life. An Earth, then, ruled by alien entities from the satellites of Jupiter, presented itself as a grim possibility.

THIS OPINION received widespread and serious attention. Leanings toward it were increased by the fact that within a week's time two more battles were fought between vaporous clouds of mist, which were the only hints which distance gave of the armadas of Ganymede and Europa. Ganymede, though the larger of the two moons, seemed to be getting the worst of the bargain.

Even Boris Lutkin was moved by what was taking place—so much so in fact that he decided to offer his weapon to the important nations of the world. Like many others, he felt that an invasion from the region of Jupiter might never occur. And yet he knew that the isolation of Earth was at an end. A new historic era was dawning. No longer could terrestrial inhabitants consider themselves immune to attack or influence from the ether beyond. The void had spoken.

Lutkin was not a pacifist where interplanetary matters were concerned, for obviously one could not deal with the unknown beings of other worlds by arbitration. Earth must be protected. The destructive power of Lutkin's weapon led him to believe that even the creatures of the Jovian moons, equipped though they evidently were with devilish devices far surpassing anything of the kind previously known on Earth, could not face it.

Lutkin noted another thing which pleased him. Since the first Europa-Ganymede incident, the various nations were forgetting their disputes and were leaning closer together, sensing possible enemies greater than themselves.

And so, after the radio system and the newspapers had blared out the information that the great savant was presenting his invention to humanity as a protective measure, Lutkin prepared a secret meeting. Statesmen and scientists, representing the powers of Earth, would be present. He would give another demonstration. Then he would distribute in the form of blue prints, written instructions and formulae, the information necessary in the building of his weapon. The date of the meeting would be the evening of August 16th.

August 16th arrived, and punctually Boris Lutkin's audience appeared at his isolated laboratory. But as though perfectly timed to coincide with the savant's move, the third pivotal incident of that historic late-summer month of the year 1951, took place. What has since been designated as the "Machine," reached Earth. For ten days or more, it must have been hurtling at terrific speed across space, bent on a purposeful mission.

The Machine was not large. It was oval in shape and perhaps eighteen inches through at its greatest diameter. Its surface was divided into octagonal facets which reflected a grayish sheen, like polished graphite. Altogether the thing had the to-be-expected aspect of a device not conceived by a human mind or fabricated by human hands.

But it is best to deal with the happenings of August 16th, and with the disturbing, half-hidden sequel—the fourth

and last pivotal incident—falling on August 31st, in closer detail.

There were a score of representatives at Boris Lutkin's gathering—a statesman and a scientist from each of ten great powers. They were assembled in a small auditorium at Lutkin's laboratory. None of the noted savant's several retainers were on the premises, for, lest they be tempted by curiosity, he had sent them away. Even his daughter, Louise, and his young assistant, Wallace Vaughn, were out for the evening.

On the rostrum stood a tripod which supported a black, cameralike box. Attached to the box was a small, simple-appearing electrical apparatus. On one side a thick, upright slab of lead rested. Beyond it were several cages in which were imprisoned various small animals and a big dog. Lutkin stood beside the black box. Before him on a table a dictaphone roll was rotating, ready to record whatever was said for future radio broadcasting when the time was ripe to make public the proceedings of the meeting. Next to the dictaphone were stacked ten neat Manila envelopes, each containing the information which the representatives of the ten nations had come to get.

BORIS LUTKIN wasted little time with formalities or reiterations. "This is the device, gentlemen," he said, indicating the black box and the small outlay of equipment attached to it. "Not very impressive, is it?" His voice was sharp, almost metallic; yet his smile was cordial and good-natured. Lutkin was an imposing figure, tall, gaunt, his magnificent head framed by a mane of flaxen hair.

For a moment he paused, waiting while his audience gazed, with some indications of awe, at the apparatus.

"This is my projector," he said, pointing to the black box. "It is connected, as you see, with a device to deliver an electric current of extremely high frequency. In the projector it is fed through a complicated maze of grids and filaments composed of several alloys of tungsten and certain rare-earth elements. Except to say that these grids and filaments constitute the essential nucleus of my invention, I need not now go into their structure, for I shall presently give you such information in detailed written form, together with diagrams and formulae.

"The passage of the electric current through the grids and filaments causes them to throw off an emanation of much shorter wave length than even cosmic rays, and of vastly greater penetrating power. Only the material from which the projector is made—a special preparation of mine—can screen it effectively.

"This emanation, however, has another far more startling property. In any substance which it touches, close to the projector or even many miles distant, chemical action is completely suspended. Under the influence of the ray, fire cannot burn, acids cannot react on metals or other materials; and life, which is of course also chemical, cannot continue to exist.

"How can this be? I am not yet entirely sure, but I can give you my theory. As I have said, electricity is involved in the production of the emanations; but it has nothing to do with their chemical deactivating powers. Yet the process is sufficiently similar to an electrical phenomenon for purposes of comparison and analogy. Electricity is, as you know, an inherent property of matter. Every substance has a certain normal quantity of it, represented by the number of electrons in the atoms that compose the substance, that are free to move. If a body loses some of its normal quantity of free electrons, it is said to be positively charged; if it gains more than it should have, it is negatively charged. Unlike charges attract, and like charges repel.

"Matter, I believe, has another property similar to that of electrically charged bodies; or at least when under the influence of my chemical deactivating emanation, it can display another property. It seems that the atoms and molecules of any substance in the path of the rays become individually charged with a hitherto unknown form of energy which acts somewhat like static electricity. But all receive the same quantity and kind of energy.

"Consequently, just as similar poles of magnets, and similarly charged pith balls, repel each other, so do the atoms and molecules of the substance in question act repulsively toward all the atoms and molecules around them. In consequence, as long as the ray is in action, no chemical union between elements can take place, even between those which normally have a great affinity for each other.

"Not only is this true, but in complex compounds like those composing organic matter, the existing chemical unions are to some slight extent actually disrupted by the repulsive action of the atoms. Were it not for this, it is conceivable that the life of an animal or plant would not be snuffed out by the ray, but would merely be suspended until the influence of the emanations was removed. As things are, the delicate structure of the tissues is disturbed sufficiently so that reanimation is impossible.

"As I have told you, this black box is my projector. Granting that a clear and unobstructed path existed to any target so distant, its effective range would be over five hundred miles. I might add that this is not the only way in which my weapon may be used. The box is quite unnecessary to the effective functioning of the apparatus which produces the emanations. It is merely a shield to protect the operator, permitting him to direct the beam safely, anywhere he chooses.

"If the box was removed, the emanations would radiate in all directions, with deadly results to any creature that happened to be near. This, as you can see, offers another opportunity for wholesale destruction. The complete apparatus, electric power supply and all, could easily be packed into a projectile and fired by a long-range gun into enemy territory, where it would, allowing for the curvature of the Earth, and the resistant effect upon the emanations of passing through soil, radiate death over a radius of perhaps fifteen or twenty miles for several hours.

"This method I do not entirely recommend, however; for it would be somewhat dangerous to the force using the weapon. You see, they could not adequately protect themselves; for the one screening substance I have found—the material from which the projector is made—requires ingredients so rare that it would be impossible to make shields to protect an army.

"That, gentlemen, is about all I need say. Now I shall do a bit of demonstrating, which, while sufficiently startling, will hardly be adequate to display the full power of my invention. We deal with dangerous things; hence it is best to do our experimenting with caution."

LUTKIN'S slender fingers turned a small dial and pressed a switch. The generator of the chemical deactivator ray made no sound loud enough to be audible to human ears. But an almost invisible beam of radiations shot from the muzzle of the projector. It impinged upon the white wall of the room, causing a little circle of deep red light to appear there. Under Lutkin's guidance, it crept waveringly upward, as he shifted the position of the projector slightly. A fly, promenading sleepily on the wall, was touched by the questing emanations and dropped dead to the floor.

Boris Lutkin chuckled softly, a triumphant glint showing in his eyes. "If that had been a native of the Jovian moons, or a hundred natives, it would have been the same," he remarked.

For half an hour Lutkin's audience watched spellbound, while he showed them the powers of his invention. Directing the rays through a slab of lead two feet in thickness, he snuffed out a candle and killed a dog instantly. Arresting completely the violent chemical action of ten pounds of sizzling, dazzling thermite, or aluminum and iron-rust mixture, was just as simple.

It was when Lutkin was in the midst of his demonstration that a telephone somewhere in a room to the rear began to ring insistently. He paid no attention to it, in fact scarcely noticed it at all. No information that any one might wish to convey to him could be of sufficient importance to warrant his dropping, even for a moment, the task in hand.

Lutkin could not know that his daughter, Louise, and his assistant, Wallace Vaughn, driving along a country highway in a sleek roadster of the sixth decade of the twentieth century, had seen something which had aroused vague fears in them, compelling them to attempt to phone him, the dim idea that they were giving a warning, troubling their minds.

They had seen a small, white-glowing speck trace a path of incandescence Earthward from somewhere among the stars. To all appearances it was a meteor—they would have been sure that it was a meteor if, for only the barest instant, they had not seen flash from it a thin streak of lemon-yellow light. That had started in their minds an eerily unpleasant train of thought.

Louise's blue eyes had gone suddenly grave. "I almost believe that it landed somewhere close to the laboratory, Wallie," she had said. "Dad ought to know —right away."

And so from the town they had just entered, they had phoned, without receiving an answer.

Vaughn shrugged. "It's only about ten miles back to the lab." He laughed half heartedly. "We can get there soon enough."

The roadster's powerful Deisel motor purred softly, sending it rocketing along the highway like a streamlined projectile.

Affairs, however, were quickly approaching a climax. Boris Lutkin and his audience were too engrossed in the demonstration to take much heed of anything beyond the marvel in which all their attention was centered. The tinkling crash of a windowpane, violently shattered, was their first intimation that all was not well. Something had gained ingress to the room. Crackling swords of yellow flame lashed out as the Machine from Ganymede went efficiently to work. There were no human eyes left in the room to see, when it groped questingly among the wreckage it had created.

But Wallace Vaughn and Louise Lutkin arrived in time to see it, as it hovered momentarily in the lighted doorway of the chamber it had devastated. Stricken with the muscle-rigor of surprise, they crouched motionless in the roadster, which was partly hidden by dense foliage. Something that was like an intuitive intimation of danger had prompted Vaughn to switch off the headlights but a moment before.

What they beheld was stamped upon their memories almost with photographic detail. They saw an ovoid object, perhaps a foot and a half long, hanging in the air in apparent defiance to gravity. It had the luster of polished graphite, and its faceted surface still glowed very dimly with the heat of its meteoric passage through the atmosphere. Its entire outer shell was dotted at regular intervals with long, straight wires, bristling from it like the prongs of a cocklebur.

THE STAMP of the unearthly on the Machine fascinated the man and the girl. Several of the wires moved like hands. They clutched two objects. Vaughn and Louise quickly recognized them, for the distance was not great. A bulky envelope—one of the envelopes containing blue prints, instructions, and formulae relative to the construction of the generator of the Lutkin chemical deactivating emanation. One of those which were to be distributed among the representatives of the great Earthly powers. The other object was part of the generator which Boris Lutkin had built. The vital part—the assembled grids and filaments of tungsten and rare-earth alloys!

A foggy idea that some sort of action should be taken was just entering Vaughn's mind, when the Machine wheeled easily about. A bolt of lemon-yellow fire darted from the knobbed tip of one of its wire appendages. A wide swath of the floor in the room beyond the doorway geysered up in a cloud of thick dust. It was a last Vandalic gesture—almost like that of a ruthless man. Was the thing a sentient mechanism, or a device guided by living intelligences from across the vastness of space? There was no way of telling. Now the machine was hurtling skyward, spaceward.

Vaughn leaped shouting from the car, Louise close behind him. Their motives were to stop the weird visitor—somehow! But how? Both were active, courageous youngsters, with more than average resource, ready to make use of any means that presented itself. But there was no means—no way. Even bravery and quick-wittedness are sometimes futile.

Within an hour the news went flashing around the world. Boris Lutkin and twenty others—internationally famous men, all—had been killed, their bodies reduced to dust by the action of what seemed to be a form of enormously accelerated decay. The generator of the chemical deactivator emanations was ruined beyond all possibility of learning from its remnants the vital principle of its function.

And the nine remaining envelopes that had contained information which would have made possible the construction of new generators were completely destroyed. Only the dictaphone which had recorded Lutkin's words was untouched. Inarticulate cries and strange clattering noises, terminating the sound impressions which its roll bore, substantiated Wallace Vaughn's and Louise Lutkin's story of an invading thing or machine that had come from outer space, accomplished its mission of theft and destruction, and had vanished again into the region of the stars.

On August 31st came the half-expected sequel. Astronomers everywhere sent out a hurried summons. Among those who gathered that evening at the Lowell Observatory of Flagstaff, Arizona, were Louise Lutkin and Vaughn.

Grave faces were turned toward a screen upon which a complicated arrangement of lenses and prisms, attached to the eyepiece of the big new telescope, cast a shifting picture. The great, belted disk of Jupiter. The moons, Ganymede and Europa, again. The conflict between them still in progress, though clearly approaching termination.

Over the soft-shining deserts of Europa, a red glow was spreading like a beautiful, rubyescent blight. It looked awesome and evil even across the vast distance. Above it a misty cloud hung—an avenging fleet, doubtless. From around the edge of the area of bloody light, threads of yellow fire spurted futilely and died.

Louise, Wallace, and another, a famous physicist named Krellmann, were conversing in low tones.

"The Ganymedeans are winning," Louise whispered, "because after they

killed dad, they stole his invention. The red glow proves it. They must have learned about the weapon somehow—maybe when he first announced its invention over the radio. Or maybe they have instruments which enable them to see in detail just what happens on Earth."

Chemical deactivating rays were being used out there. Every one knew now that it was true. Grave eyes widened in awe; solemn faces took on a faint pallor. There was no certainty in the interplanetary threat that all envisioned. Probably it would never be realized. And yet, unarmed as they now were, the peoples of Earth would never again feel at ease. A holocaust, such as mankind had never experienced, was going on out there. Who knew? Who could be sure?

"You have no information that would enable us to build a new weapon?" Krellmann inquired.

The girl and the youth shook their heads. It was perhaps the hundredth time that the question had been put to them.

"Though we of course helped Dr. Lutkin in his experiments with the emanation, he kept the key invention of his weapon strictly to himself," Vaughn told the physicist. "We saw the grids and filaments often—in fact we might even make a crude drawing of them. But the precise spacing of hundreds of fine wires, and the delicately balanced alloys from which they were made, were the products of one of the most brilliant minds of our time, working over a period of many years.

"Dr. Lutkin's own notebook of specifications, I believe, perished with him; for he usually carried it inside his coat, and there is no evidence of it around the lab now. Looks as though the chemical deactivator ray is lost. Still, what man has discovered once, man can discover again. The least we can do is try."

Vaughn smiled faintly at Louise. Her eyes were misty with a still poignant grief, yet she smiled back. Her slender fingers touched his.

"We will," she said.

The hypermen encountered an irresistibly driven wall of crushing, tearing, dismembering and all-destroying metal.

The Skylark of Valeron

The fourth part of the epic of far galaxies and spaceways

by Edward E. Smith, Ph. D.

Illustrated by Elliot Dold

UP TO NOW:

Richard Seaton liberates the intra-atomic energy of copper. He and Martin Crane build a space ship, "Skylark of Space." Brookings, wily head of the World Steel Corporation, tries to steal the invention. Failing, he calls in DuQuesne, an unscrupulous scientist, who succeeds. DuQuesne builds a space ship from the stolen plans and abducts Dorothy Vaneman, Seaton's fiancée, and Margaret Spencer. Out of control, his ship drives through space until her copper is exhausted.

Seaton and Crane follow DuQuesne by means of an "object-compass" focused upon him. They effect a rescue, but their fuel runs low. Several planets are visited; in particular one having an atmosphere of chlorin, and another materialized by a group of beings purely intellectual, instead of physical, in nature. Escaping from these entities, they fly toward a cluster of green suns.

They land upon Osnome and are of service to Kondal, a nation of that world, against Mardonale, its other nation. Dunark, of Osnome, and Seaton, operating a "mechanical educator", accidentally superimpose the entire brain of each upon that of the other. Seaton marries Dorothy, Crane marries Margaret. They return to Earth, DuQuesne escaping just before landing.

Summoned by Dunark, Seaton and his friends return to Osnome in "Skylark Two." On the way they meet and defeat a war vessel of the Fenachrone, a monstrous race of immense scientific attainments whose goal is universal conquest. DuQuesne, bent on destroying Seaton, rescues a survivor of the warship and agrees to return him to his own planet in exchange for his help in stealing a Fenachrone battleship. Both are lying—each intends to double-cross the other.

In quest of a science to equal that of the Fenachrone, Seaton visits Urvania, a planet then at war with Osnome; Dasor, a watery planet inhabited by a race of almost amphibious humanity; and lastly Norlamin, where he finds the advanced science he is seeking. Rovol, First of Rays, and Drasnik, First of Psychology, each impress upon Seaton's mind a large measure of his own knowledge. They build a fifth-order projectile and destroy all the Fenachrone vessels in space save one, which has left this Galaxy entirely. "Skylark Three" is built, and Seaton sets out after the fleeing vessel; emerging the victor after a battle of giants.

DuQuesne and Loring, his assistant, drug their captive Fenachrone engineer and read his mind. They capture, first a scout ship and then a first-class battleship. After the destruction of the Fenachrone planet they visit Norlamin, where DuQuesne, pretending to be Seaton's aid, persuades Rovol to build a duplicate of "Skylark Three." In it he sets out, supposedly to go to Seaton's assistance, but doubles back to Earth

and makes himself undisputed master of the planet.

Seaton succeeds in generating waves of the sixth order and learns that thought is in that level. "Skylark Three" is attacked by the purely intellectual entities. To escape them, Seaton rotates "Skylark Two," which has been carried as a lifeboat, into the fourth dimension; finding it to be a peculiar region indeed. The vessel sinks into the unsubstantial soil and the Terrestrials are overcome by the hypermen. Seaton and Margaret are carried away and imprisoned. They escape and are making their way back to the "Skylark" when they are halted by the fall of night—a hyper-blackness in which not only does no light whatever exist, but one in which no light can be produced.

XIII.

AS SUDDENLY as the hyperland had become dark it at last became light. There was no gradual lightening, no dawning, no warning—in an instant, blindingly to eyes which had for so long been straining in vain to detect even the faintest ray of visible light in the platinum-black darkness of the hypervoid, the entire countryside burst into its lividly glowing luminescence. As the light appeared Seaton leaped to his feet with a yell.

"Yowp! I was never so glad to see a light before in all my life, even if it *is* blue! Didn't sleep much either, did you, Peg?"

"Sleep? I don't believe that I'll *ever* be able to sleep again! It seemed as though I was lying there for weeks!"

"It did seem long, but time is meaningless to us here, you know."

The two set out at a rapid pace, down the narrow beach beside the hyper-stream. For a long time nothing was said, then Margaret broke out, half hysterically:

"Dick, this is simply driving me mad! I think probably I *am* mad, already. We seem to be walking, yet we aren't, really; we're going altogether too fast, and yet we don't seem to be getting anywhere. Besides, it's taking forever and ever——"

"Steady, Peg! Keep a stiff upper lip! Of course we really aren't walking, in a three-dimensional sense, but we're getting there, just the same. I'd say that we were traveling almost half as fast as that airship was, which is a distinctly cheerful thought. And don't try to think of anything in detail, because equally of course we can't understand it.

"And as for time, forget it. Just remember that, as far as we are concerned, this whole episode is occupying only a thousandth of a second of our own real time, even if it seems to last a thousand years.

"And, above all, get it down solid that you're not nutty—it's just that everything else around here is. It's like that wild one Sir Eustace pulled on me that time, remember? 'I say, Seaton, old chap, the chaps hereabout seem to regard me as a foreigner. Now really, you know, they should realize that I am simply alone in a nation of foreigners.'"

Margaret laughed, recovering a measure of her customary poise at Seaton's matter-of-fact explanations and reassurance, and the seemingly endless journey went on. Indeed, so long did it seem that the high-strung and apprehensive Seaton was every moment expecting the instantaneous hypernight again to extinguish all illumination long before they came within sight of the little island, with its unmistakably identifying obelisk of reddish stone.

"Woof, but that's a relief!" he exploded at sight of the marker. "We'll be there in a few minutes more—here's hoping it holds off for those few minutes!"

"It will," Margaret said confidently. "It'll have to, now that we're so close. How are you going to get a line on those three peaks? We cannot possibly see over or through that jungle."

"Easy—just like shooting fish down a well. That's one reason I was so glad to see that tall obelisk thing over there—it's big enough to hold my weight and high enough so that I can see the peaks from its top. I'm going to climb up it and wigwag you onto the line we want. Then we'll set a pole on that line and crash through the jungle, setting up back-sights as we go along. We'll be able to see the peaks in a mile or so, and once we see them it'll be easy enough to find *Two*."

"But climbing Cleopatra's Needle comes first, and it's straight up and down," Margaret objected practically. "How are you going to do that?"

"With a couple of hypergrab-hooks—watch me!"

He wrenched off three of the bars of his cell grating and twisted them together, to form a heavy rod. One end of this rod he bent back upon itself, sharpening the end by squeezing it in his two hands. It required all of his prodigious strength, but in his grasp the metal at last, slowly, flowed together in a perfect weld and he waved in the air a sharply pointed hook some seven feet in length. In the same way he made another, and, with a word to the girl, he shot away through the almost intangible water toward the island.

He soon reached the base of the obelisk, and into its rounded surface he drove one of his hyperhooks. But he struck too hard. Though the hook was constructed of the most stubborn metal known to the denizens of that strange world, the obelisk was of hyperstone and the improvised tool rebounded, bent out of all semblance and useless.

It was quickly reshaped, however, and Seaton went more gently about his task. He soon learned exactly how much pressure his hooks would stand, and also the best method of imbedding the sharp metal points in the rock of the monument. Then, both hooks holding, he drove the toe of one heavy boot into the stone and began climbing.

SOON, however, his right-hand hook refused to bite; the stone had so dulled the point of the implement that it was useless. After a moment's thought Seaton settled both feet firmly and, holding the shaft of the left-hand hook under his left elbow, bent the free end around behind his back. Then, both hands free, he essayed the muscle-tearing task of squeezing that point again into serviceability.

"Watch out, Dick—you'll fall!" Margaret called.

"I'll try not to," he called back cheerfully. "Took too much work and time to get up this far to waste it. Wouldn't hurt me if I did fall—but you might have to come over and pull me out of the ground."

He did not fall. The hook was repointed without accident and he continued up the obelisk—a human fly walking up a vertical column. Four times he had to stop to sharpen his climbers, but at last he stood atop the lofty shaft. From that eminence he could see not only the three peaks, but even the scene of confused activity which he knew marked the mouth of the gigantic well at whose bottom the *Skylark* lay. Margaret had broken off a small tree, and from the obelisk's top Seaton directed its placing as a transit man directs the setting of his head flag.

"Left—'way left!" His arm waved its hook in great circles. "Easy now!" Left arm poised aloft. "All right for line!" Both arms swept up and down, once. A careful recheck—— "Back a hair." Right arm out, insinuatingly. "All right for tack—down she goes!" Both arms up and down, twice, and the

feminine flagman drove the marker deep into the sand.

"You might come over here, Peg!" Seaton shouted, as he began his hasty descent. "I'm going to climb down until my hooks get too dull to hold, and then fall the rest of the way—no time to waste sharpening them—and you may have to rally 'round with a helping hand."

Scarcely a third of the way down, one hook refused to function. A few great plunging steps downward and the other also failed—would no longer even scratch the stubborn stone. Already falling, Seaton gathered himself together, twisted bars held horizontally beneath him, and floated gently downward. He came to ground no harder than he would have landed after jumping from a five-foot Earthly fence; but even his three-ply bars of hypermetal did not keep him from plunging several feet into that strangely unsubstantial hyperground.

Margaret was there, however, with her grating and her plate of armor. With her aid Seaton struggled free, and together they waded through the river and hurried to the line post which Margaret had set. Then, along the line established by the obelisk and the post, the man crashed into the thick growth of the jungle, the woman at his heels.

Though the weirdly peculiar trees, creepers, and bamboolike shoots comprising the jungle's vegetation were not strong enough to bar the progress of the dense, hard, human bodies, yet they impeded that progress so terribly that the trail-breaker soon halted.

"Not so good this way, Peg," he reflected. "These creepers will soon pull you down, I'm afraid; and, besides, we'll be losing our line pretty quickly. What to do? Better I knock out a path with this magic wand of mine, I guess—none of this stuff seems to be very heavy."

Again they set out; Seaton's grating, so bent and battered now that it could not be recognized as once having been the door of a prison cell, methodically sweeping from side to side; a fiercely driven scythe against which no hyperthing could stand. Vines and creepers still wrapped around and clung to the struggling pair; shattered masses drifted down upon them from above, exuding in floods a viscous, gluey sap; and both masses of broken vegetation and floods of adhesive juices reënforced and rendered even more impassible the already high-piled wilderness of débris which had been accumulating there during time unthinkable.

THUS hampered, but driven to highest effort by the fear of imminent darkness and consequent helplessness, they struggled indomitably on. On and on; while behind them stretched an everlengthening, straight, sharply cut streak of blackness in the livid hyperlight of the jungle.

Seaton's great mass and prodigious strength enabled him to force his way through that fantastically inimical undergrowth without undue difficulty, but the unremitting pull and drag of the attacking vines eventually wore down the woman's much slighter physique.

"Just a minute, Dick!" She stopped, strength almost spent. "I hate to admit that I can't stand the pace, especially since you are doing all the real work, as well as wading through the same mess that I am, but I don't believe that I can go on much longer without a rest."

"All right——" Seaton began, but broke off, staring ahead. "No; keep on coming one minute more, Peg—three more jumps and we're through."

"I can go that much farther, of course. Lead on, MacDuff!" and they struggled on.

Seaton had spoken truly. In a few more steps they broke out of the thick growth of the jungle and into the al-

most-palpable darkness of a great, roughly circular area which had been cleared of the prolific growth. In the center of this circle could be seen the bluely illuminated works of the engineers who were raising *Skylark Two.* The edge of the great well was surrounded by four-dimensional machinery; and that well's wide apron and its towering derricks were swarming with hypermen.

"Stay behind me, Peg, but as close as you can without getting hit," the man instructed his companion after a hasty but comprehensive study of the scene. "Keep your shield up and have your grating in good swinging order. I'll be able to take care of most of them, I think, but you want to be ready to squash any of them that may get around me or who may rush us from behind. Those stickers of theirs are bad medicine, girl, and we don't want to take any chances at all of getting stuck again."

"I'll say we don't!" she agreed feelingly, and Seaton started off over the now unencumbered ground. "Wait a minute, Dick—where are you, anyway? I can't see you at all!"

"That's right, too. Never thought of it, but there's no light. The glimmer of those plants is pretty faint, at best, and doesn't reach out here at all. We'd better hold hands, I guess, until we get close to the works out there so that we can see what we're doing and what's going on."

"But I've got only two hands—I'm not a hippocampus—and they're both full of doors and clubs and things. But maybe I can carry this shield under my arm, it isn't heavy—there, where are you, anyway?"

Seeking hands found each other, and, hand in hand, the two set out boldly toward the scene of activity so starkly revealed in the center of that vast circle of darkness. So appalling was the darkness that it was a thing tangible—palpable. Seaton could not see his companion, could not see the weapons and the shield he bore, could not even faintly discern the very ground upon which he trod. Yet he plunged forward, almost dragging the girl along bodily, eyes fixed upon the bluely gleaming circle of structures which was his goal.

"But Dick!" Margaret panted. "Let's not go so fast; I can't see a thing—not even my hand right in front of my eyes—and I'm afraid we'll bump into something—anything!"

"We've got to snap it up, Peg," the man replied, not slackening his pace in the slightest, "and there's nothing very big between us and the *Skylark,* or we could see it against those lights. We may stumble over something, of course, but it'll be soft enough so that it won't hurt us any. But suppose that another night clamps down on us before we get out there?"

"Oh, that's right; it did come awfully suddenly," and Margaret leaped ahead; dread of the abysmally horrible hypernight so far outweighing her natural fear of unseen obstacles in her path that the man was hard put to it to keep up with her. "Suppose they'll know we're coming?"

"Maybe—probably—I don't know. I don't imagine they can see us, but since we cannot understand anything about them, it's quite possible that they may have other senses that we know nothing about. They'll have to spot us mighty quick, though, if they expect to do themselves any good."

The hypermen could not see them, but it was soon made evident that the weird beings had indeed, in some unknown fashion, been warned of their coming. Mighty searchlights projected great beams of livid blue light, beams which sought eagerly the human beings—probing, questing, searching.

As he perceived the beams Seaton knew that the hypermen could not see without lights any better than he could;

and, knowing what to expect, he grinned savagely into the darkness as he threw an arm around Margaret and spoke—or thought—to her.

"One of those beams'll find us pretty quick, and they may send something along it. If so, and if I yell jump, do it quick. Straight up; high, wide, and handsome—jump!"

FOR EVEN as he spoke, one of the stabbing beams of light had found them and had stopped full upon them. And almost instantly had come flashing along that beam a horde of hypermen, armed with peculiar weapons at whose use the Terrestrials could not even guess.

But also almost instantly had Seaton and Margaret jumped—jumped with the full power of Earthly muscles which, opposed by only the feeble gravity of hyperland, had given their bodies such a velocity that to the eyes of the hypermen their intended captives had simply and instantly disappeared.

"They knew we were there, all right, some way or other—maybe our mass jarred the ground—but they apparently can't see us without lights, and that gives us a break," Seaton remarked conversationally, as they soared interminably upward. "We ought to come down just about where that tallest derrick is—right where we can go to work on them."

But the scientist was mistaken in thinking that the hypermen had discovered them through tremors of the ground. For the searching cones of light were baffled only for seconds; then, guided by some sense or by some mechanism unknown and unknowable to any three-dimensional intelligence, they darted aloft and were once more outlining the fleeing Terrestrials in the bluish glare of their livid radiance. And upward, along those illuminated ways, darted those living airplanes, the hypermen; and this time the man and the woman, with all their incredible physical strength, could not leap aside.

"Not so good," said Seaton, "better we'd stayed on the ground, maybe. They *could* trace us, after all; and of course this air is their natural element. But now that we're up here, we'll just have to fight them off; back to back, until we land."

"But how can we stay back to back?" asked Margaret sharply. "We'll drift apart at our first effort. Then they'll be able to get behind us and they'll have us again!"

"That's so, too—never thought of that angle, Peg. You've got a belt on, haven't you?"

"Yes."

"Fine! Loosen it up and I'll run mine through it. The belts and an ankle-and-knee lock'll hold us together and in position to play tunes on those sea horses' ribs. Keep your shield up and keep that grating swinging and we'll lay them like a carpet."

Seaton had not been idle while he was talking, and when the attackers drew near, vicious tridents outthrust, they encountered an irresistibly driven wall of crushing, tearing, dismembering, and all-destroying metal. Back to back the two unknown monstrosities floated through the air; interlaced belts holding their vulnerable backs together, gripped legs holding their indestructibly dense and hard bodies in alignment.

For a time the four-dimensional creatures threw themselves upon the Terrestrials, only to be hurled away upon all sides, ground literally to bits. For Margaret protected Seaton's back, and he himself took care of the space in front of him, to right and to left of them, above and below them; driving the closely spaced latticework of his metal grating throughout all that space so viciously and so furiously that it seemed to be omnipresent as well as omnipotent.

THEN, giving up hope of recapturing the specimens alive, the hyperbeings turned upon them their lethal beams. Soft, pinkly glowing beams which turned to a deep red and then flamed through the spectrum and into the violet as they were found to have no effect upon the human bodies. But the death rays of the hypermen, whatever the frequency, were futile—the massed battalions at the pit's mouth were as impotent as had been the armed forces of the great hypercity, whose denizens had also failed either to hold or to kill the supernatural Terrestrials.

During the hand-to-hand encounter the two had passed the apex of their flight; and now, bathed in the varicolored beams, they floated gently downward, directly toward the great derrick which Seaton had pointed out as marking their probable landing place. In fact, they grazed one of the massive corner members of the structure; but Seaton interposed his four-dimensional shield and, although the derrick trembled noticeably under the impact, neither he nor Margaret was hurt as they drifted lightly to the ground.

"Just like jumping off of and back into a feather bed!" Seaton exulted, as he straightened up, disconnected the hampering belts, and guided Margaret toward the vast hole in the ground, unopposed now save for the still-flaring beams. "Wonder if any more of them want to argue the right of way with us? Guess not."

"But how are we going to get down there?" asked Margaret.

"Fall down—or, better yet, we'll slide down those chains they've already got installed. You'd better carry all this junk, and I'll kind of carry you. That way you won't have to do anything—just take a ride."

Scarcely encumbered by the girl's weight, Seaton stepped outward to the great chain cables, and hand under hand he went down, down past the huge lifting cradles which had been placed around the massive globe of arenak.

"But we'll go right through it—there's nothing to stop us in this dimension!" protested Margaret.

"No, we won't; and yes, there is," Seaton replied. "We swing *past* it and down, around onto level footing, on this loose end of chain—like this, see?" and they were once more in the control room of *Skylark Two*.

There stood Dorothy, Crane, and Shiro, exactly as they had left them so long before. Still held in the grip of the tridents, they were silent, immobile; their eyes were vacant and expressionless. Neither Dorothy nor Crane gave any sign of recognition, neither seemed even to realize that their loved ones, gone so long, had at last returned.

XIV.

SEATON'S glance leaped to his beloved Dorothy. Drooping yet rigid she stood there, unmoving, corpselike. Accustomed now to seeing four-dimensional things by consciously examining only their three-dimensional surfaces, he perceived instantly the waxen, utterly inhuman vacuity of her normally piquant and vivacious face—perceived it, and at that perception went mad.

Clutching convulsively the length of hyperchain by which he had swung into the control room he leaped, furious and elementally savage.

So furious was his action that the chain snapped apart at the wall of the control room; so rapid was it that the hyperguard had no time to move, nor even to think.

That guard had been peacefully controlling with his trident the paralyzed prisoner. All had been quiet and calm. Suddenly—in an instant—had appeared the two monstrosities who had been taken to the capital. And in that same fleeting instant one of the monsters was leaping at him. And ahead of that

monster there came lashing out an enormous anchor chain, one of whose links of solid steel no ordinary mortal could lift; an anchor chain hurtling toward him with a velocity and a momentum upon that tenuous hyperworld unthinkable.

The almost-immaterial flesh of the hyperman could no more withstand that fiercely driven mass of metal than can a human body ward off an armor-piercing projectile in full flight. Through his body the great chain tore; cutting, battering, rending it into ghastly, pulpily indescribable fragments unrecognizable as ever having been anything animate. Indeed, so fiercely had the chain been urged that the metal itself could not stand the strain. Five links broke off at the climax of the chain's black-snakelike stroke, and, accompanying the bleeding scraps of flesh that had been the guard, tore on past the walls of the space ship and out into the hypervoid.

The guard holding his tridents in Crane and Shiro had not much more warning. He saw his fellow obliterated, true; but that was all he lived to see, and he had time to do exactly nothing. One more quick flip of Seaton's singularly efficient weapon and the remains of that officer also disappeared into hyperspace. More of the chain went along, this time, but that did not matter. Dropping to the floor the remaining links of his hyperflail, Seaton sprang to Dorothy, reaching her side just as the punishing trident, released by the slain guard, fell away from her.

She recovered her senses instantly and turned a surprised face to the man, who, incoherent in his relief that she was alive and apparently unharmed, was taking her into his arms.

"Why, surely, Dick, I'm all right—how could I be any other way?" she answered his first agonized question in amazement. She studied his worn face in puzzled wonder and went on: "But you certainly are not. What has happened, dear, anyway; and how could it have, possibly?"

"I hated like sin to be gone so long, Dimples, but it couldn't be helped." Seaton, in his eagerness to explain his long absence, did not even notice the peculiar implications in his wife's speech and manner. "You see, it was a long trip, and we didn't get a chance to break away from those meat hooks of theirs until after they got us into their city and examined us. Then, when we finally did break away, we found that we couldn't travel at night. Their days are bad enough, with this thick blue light, but during the nights there's absolutely no light at all, of any kind. No moon, no stars, no nothing——"

"Nights! What are you talking about, Dick, anyway?" Dorothy had been trying to interrupt since his first question and had managed at last to break in. "Why, you haven't been gone at all, not even a second. We've all been right here, all the time!"

"Huh?" ejaculated Seaton. "Are you cuckoo, Red-Top, or what——"

"Dick and I were gone at least a week, Dottie," Margaret, who had been embracing Crane, interrupted in turn, "and it was awful!"

"Just a minute, folks!" Seaton listened intently and stared upward. "We'll have to let the explanations ride a while longer. I thought they wouldn't give up that easy—here they come! I don't know how long we were gone—it seemed like a darn long time—but it was long enough so that I learned how to mop up on these folks, believe me! You take that sword and buckler of Peg's, Mart. They don't look so hot, but they're big medicine in these parts. All we've got to do is swing them fast enough to keep those stingaroos of theirs out of our gizzards and we're all set. Be careful not to hit too hard, though, or you'll bust that grating into forty pieces—it's hyperstuff,

nowhere near as solid as anything we're used to. All it'll stand is about a normal fly-swatting stroke, but that's enough to knock any of these fan-tailed humming birds into an outside loop. Ah, they've got guns or something! Duck down, girls, so we can cover you with these shields; and, Shiro, you might pull that piece of chain apart and throw the links at them—that'll be good for what ails them!"

The hypermen appeared in the control room, and battle again was joined. This time, however, the natives did not rush to the attack with their tridents; nor did they employ their futile rays of death. They had guns, shooting pellets of metal; they had improvised crossbowlike slings and catapults; they had spears and javelins made of their densest materials, which their strongest men threw with all their power. But pellets and spears alike thudded harmlessly against four-dimensional shields—shields once the impenetrable, unbreakable doors of their mightiest prison—and the masses of metal and stone vomited forth by the catapults were caught by Seaton and Crane and hurled back through the ranks of the attackers with devastating effect. Shiro also was doing untold damage with his bits of chain and with such other items of four-dimensional matter as came to hand.

Still the hypermen came pressing in, closer and closer. Soon the three men were standing in a triangle, in the center of which were the women, their flying weapons defining a volume of space to enter which meant hideous dismemberment and death to any hypercreature. But on they came, willing, it seemed, to spend any number of lives to regain their lost control over the Terrestrials; realizing, it seemed, that even those supernaturally powerful beings must in time weaken.

WHILE the conflict was at its height, however, it seemed to Seaton that the already tenuous hypermen were growing even more wraithlike; and at the same time he found himself fighting with greater and greater difficulty. The lethal grating, which he had been driving with such speed that it had been visible only as a solid barrier, moved more and ever more slowly, to come finally to a halt in spite of his every effort.

He could not move a muscle, and despairingly he watched a now almost-invisible warden who was approaching him, controlling trident outthrust. But to his relieved surprise the hyperforceps did not touch him, but slithered *past him* without making contact; and hyperman and hyperweapon disappeared altogether, fading out slowly into nothingness.

Then Seaton found himself moving in space. Without volition he was floating across the control room, toward the switch whose closing had ushered the Terrestrials out of their familiar space of three dimensions and into this weirdly impossible region of horror. He was not alone in his movement. Dorothy, the Cranes, and Shiro were all in motion, returning slowly to the identical positions they had occupied at the instant when Seaton had closed his master switch.

And as they moved, they *changed*. The *Skylark* herself changed, as did every molecule, every atom of substance, in or of the spherical cruiser of the void.

Seaton's hand reached out and grasped the ebonite handle of the switch. Then, as his entire body came to rest, he was swept by wave upon wave of almost-unbearable relief as the artificial and unnatural extension into the fourth dimension began to collapse. Slowly, as had progressed the extrusion into that dimension, so progressed the de-extrusion from it. Each ultimate particle of matter underwent an indescribable and incomprehensible foreshortening; a

compression; a shrinking together; a writhing and twisting reverse rearrangement, each slow increment of which was poignantly welcome to every outraged unit of human flesh.

Suddenly seeming, and yet seemingly only after untold hours, the return to three-dimensional space was finished. Seaton's hand drove through the remaining fraction of an inch of its travel with the handle of the switch; his ears heard the click and snap of the lightning-fast plungers driving home against their stop blocks—the closing of the relay switches had just been completed. The familiar fittings of the control room stood out in their normal three dimensions, sharp and clear.

Dorothy sat exactly as she had sat before the transition. She was leaning slightly forward in her seat—her gorgeous red-bronze hair in perfect order, her sweetly curved lips half parted, her violet eyes widened in somewhat fearful anticipation of what the dimensional translation was to bring. She was unchanged—but Seaton!

He also sat exactly as he had sat an instant—or was it a month?—before; but his face was thin and heavily lined, his normally powerful body was now gauntly eloquent of utter fatigue. Nor was Margaret in better case. She was haggard, almost emaciated. Her clothing, like that of Seaton, had been forced to return to a semblance of order by the exigencies of interdimensional and intertime translation, and for a moment appeared sound and whole.

The translation accomplished, however, that clothing literally fell apart. The dirt and grime of their long, hard journey and the sticky sap of the hyperplants through which they had fought their way had of course disappeared—being four-dimensional material, all such had perforce remained behind in four-dimensional space—but the thorns and sucking disks of the hypervegetation had taken toll. Now each rent and tear reappeared, to give mute but eloquent testimony to the fact that the sojourn of those two human beings in hyperland had been neither peaceful nor uneventful.

Dorothy's glance flashed in amazement from Seaton to Margaret, and she repressed a scream as she saw the ravages wrought by whatever it was that they had gone through.

But Seaton's first thought was for the bodiless foes whom they might not have left behind. "Did we get away, Mart?" he demanded, hand still upon the switch. Then, without waiting for a reply, he went on: "We must've made it, though, or we'd've been dematerialized before this. Three rousing cheers! We made it—we made it!"

For several minutes all four gave way to their mixed but profound emotions, in which relief and joy predominated. They had escaped from the intellectuals; they had come alive through hyperspace!

"But Dick!" Dorothy held Seaton off at arm's length and studied his gaunt, lined face. "Lover, you look actually thin."

"I *am* thin," he replied. "We were gone a week, we told you. I'm just about starved to death, and I'm thirstier even than that. Not being able to eat is bad; but going without water is worse, believe me! My whole insides feel like a mess of desiccated blotters. Come on, Peg; let's empty us a couple of water tanks."

They drank; lightly and intermittently at first, then deeply.

At last Seaton put down the pitcher. "That isn't enough, by any means; but we're damp enough inside so that we can swallow food, I guess. While you're finding out where we are, Mart, Peg and I'll eat six or eight meals apiece."

WHILE Seaton and Margaret ate—ate as they had drunk, carefully, but

But the squat and monstrous flying fort burst upward through the seething surface and was again in full action.

with every evidence of an insatiable bodily demand for food—Dorothy's puzzled gaze went from the worn faces of the diners to a mirror which reflected her own vivid, unchanged self.

"But I don't understand it at all, Dick!" she burst out at last. *"I'm* not thirsty, nor hungry, and I haven't changed a bit. Neither has Martin; and yet you two have lost pounds and pounds and look as though you had been pulled through a knot hole. It didn't seem to us as though you were away from us all. You were going to tell me about that back there, when we were interrupted. Now go ahead and explain things, before I explode. What happened, anyway?"

Seaton, hunger temporarily assuaged, gave a full but concise summary of everything that had happened while he and Margaret were away from the *Skylark*. He then launched into a scientific dissertation, only to be interrupted by Dorothy.

"But, Dick, it doesn't sound reasonable that all that could *possibly* have happened to you and Peggy without our even knowing that any time at all had passed!" she expostulated. "We weren't unconscious or anything, were we, Martin? We knew what was going on all the time, didn't we?"

"We were at no time unconscious, and we knew at all times what was taking place around us," Crane made surprising but positive answer. He was seated at a visiplate, but had been listening to the story instead of studying the almost-sheer emptiness that was space. "And since it is a truism of Norlaminian psychology that any lapse of consciousness, of however short duration, is impressed upon the consciousness of a mind of even moderate power, I feel safe in saying that for Dorothy and me, at least, no lapse of time did occur or could have occurred."

"There!" Dorothy exulted. "You've got to admit that Martin knows his stuff. How are you going to get around that?"

"Search me—wish I knew." Seaton frowned in thought. "But Mart chirped it, I think, when he said 'for Dorothy and me, at least,' because for us two time certainly lapsed, and lapsed plenty. However, Mart certainly *does* know his stuff; the old think tank is full of bubbles all the time. He doesn't make positive statements very often, and when he does you can sink the bank roll on 'em. Therefore, since you were both conscious and time did not lapse—for you—it must have been time itself that was cuckoo instead of you. It must have stretched, or must have been stretched, like the very dickens—for you.

"Where does that idea get us? I might think that their time was intrinsically variable, as well as being different from ours, if it was not for the regular alternation of night and day—of light and darkness, at least—that Peg and I saw, and which affected the whole country, as far as we could see. So that's out.

"Maybe they treated you two to a dose of suspended animation or something of the kind, since you weren't going anywhere—— Nope, that idea doesn't carry the right earmarks, and besides it would have registered as such on Martin's Norlaminianly psychological brain. So that's out, too. In fact, the only thing that could deliver the goods would be a sta—but that'd be a trifle strong, even for a hyperman, I'm afraid."

"What would?" demanded Margaret. "Anything that you would call strong ought to be worth listening to."

"A stasis of time. Sounds a trifle far-fetched, of course, but——"

"But phooey!" Dorothy exclaimed. "Now you *are* raving, Dick!"

"I'm not so sure of that, at all," Seaton argued stubbornly. "They really understand time, I think, and I picked

up a couple of pointers. It would take a sixth-order field—— That's it, I'm pretty sure, and that gives me an idea. If they can do it in hypertime, why can't we do it in ours?"

"I fail to see how such a stasis could be established," argued Crane. "It seems to me that as long as matter exists time must continue, since it is quite firmly established that time depends upon matter—or rather upon the motion in space of that which we call matter."

"Sure—that's what I'm going on. Time and motion are both relative. Stop all motion—relative, not absolute motion—and what have you? You have duration without sequence or succession, which is what?"

"That would be a stasis of time, as you say," Crane conceded, after due deliberation. "How can you do it?"

"I don't know yet whether I can or not—that's another question. We already know, though, how to set up a stasis of the ether along a spherical surface, and after I have accumulated a little more data on the sixth order it should not be impossible to calculate a volume-stasis in both ether and subether, far enough down to establish complete immobility and local cessation of time in gross matter so affected."

"But would not all matter so affected assume at once the absolute zero of temperature and thus preclude life?"

"I don't think so. The stasis would be sub-atomic and instantaneous, you know; there could be no loss or transfer of energy. I don't see how gross matter could be affected at all. As far as I can see it would be an absolutely perfect suspension of animation. You and Dot lived through it, anyway, and I'm positive that that's what they did to you. And I still say that if anybody can do it, we can."

"'And that,'" put in Margaret roguishly, "as you so feelingly remark, 'is a cheerful thought to dwell on—let's dwell on it!'"

"We'll do that little thing, too, Peg, some of these times; see if we don't!" Seaton promised. "But to get back to our knitting, what's the good word, Mart—located us yet? Are we, or are we not, heading for that justly famed distant Galaxy of the Fenachrone?"

"We are not," Crane replied flatly, "nor are we heading for any other point in space covered by the charts of Ravindau's astronomers."

"Huh? Great Cat!" Seaton joined the physicist at his visiplate, and made complete observations upon the few nebulae visible.

He turned then to the charts, and his findings confirmed those of Crane. They were so far away from our own Galaxy that the space in which they were was unknown, even to those masters of astronomy and of intergalactic navigation, the Fenachrone.

"Well, we're not lost, anyway, thanks to your cautious old bean." Seaton grinned as he stepped over to an object-compass mounted upon the plane table.

THIS particular instrument was equipped with every refinement known to the science of four great Solar Systems. Its exceedingly delicate needle, swinging in an almost-perfect vacuum upon practically frictionless jeweled bearings, was focused upon the unimaginable mass of the entire First Galaxy, a mass so inconceivably great that mathematics had shown—and even Crane would have stated as a fact—that it would affect that needle from any point whatever, however distant, in universal space.

Seaton actuated the minute force which set the needle in motion, but it did not oscillate. For minute after minute it revolved slowly but freely, coming ultimately to rest without any indication of having been affected in the least by any external influence. He stared at the compass in stark, unbelieving amazement, then tested its cur-

rent and its every other factor. The instrument was in perfect order and in perfect adjustment. Grimly, quietly, he repeated the oscillatory test—with the same utterly negative result.

"Well, that is eminently, conclusively, definitely, and unqualifiedly that." He stared at Crane, unseeing, his mind racing. "The most sensitive needle we've got, and she won't even register!"

"In other words, we are lost." Crane's voice was level and calm. "We are so far away from the First Galaxy that even that compass, supposedly reactive from any possible location in space, is useless."

"But I don't get it, at all, Mart!" Seaton expostulated, paying no attention to the grim meaning underlying his friend's utterance. "With the whole mass of the Galaxy as its object of attachment that needle absolutely will register from a distance greater than any possible diameter of the super-universe——" His voice died away.

"Go on; you are beginning to see the light," Crane prompted.

"Yeah—no wonder I couldn't plot a curve to trace those Fenachrone torpedoes—our fundamental assumptions were unsound. The fact simply is that if space is curved at all, the radius of curvature is vastly greater than any figure as yet proposed, even by the Fenachrone astronomers. We certainly weren't out of our own space a thousandth of a second—more likely only a couple of millionths—do you suppose that there really are folds in the fourth dimension?"

"That idea has been advanced, but folds are not strictly necessary, nor are they easy to defend. It has always seemed to me that the hypothesis of linear departure is much more tenable. The planes need not be parallel, you know—in fact, it is almost a mathematical certainty that they are *not* parallel."

"That's so, too; and that hypothesis would account for everything, of course. But how are——"

"What *are* you two talking about?" demanded Dorothy. "We simply couldn't have come that far—why, the *Skylark* was stuck in the ground the whole time!"

"As a physicist, Red-Top, you're a fine little beauty-contest winner." Seaton grinned. "You forget that with the velocity she had, the *Lark* couldn't have been stopped within three months, either—yet she seemed to stop. How about that, Mart?"

"I have been thinking about that. It is all a question of relative velocities, of course; but even at that, the angle of departure of the two spaces must have been extreme indeed to account for our present location in three-dimensional space."

"Extreme is right; but there's no use yapping about it now, any more than about any other spilled milk. We'll just have to go places and do things; that's all."

"Go where and do what?" asked Dorothy pointedly.

"Lost—lost in space!" Margaret breathed.

As the dread import of their predicament struck into her consciousness she had seized the arm rests of her chair in a spasmodic clutch; but she forced herself to relax and her deep brown eyes held no sign of panic.

"But we have been lost in space before, Dottie, apparently as badly as we are now. Worse, really, because we did not have Martin and Dick with us then."

"'At-a-girl, Peg!" Seaton cheered. "We may—be lost—guess we are, temporarily, at least—but we're not licked, not by seven thousand rows of apple trees!"

"I fail to perceive any very solid basis for your optimism," Crane remarked quietly, "but you have an idea, of course. What is it?"

"Pick out the Galaxy nearest our line of flight and brake down for it." Seaton's nimble mind was leaping ahead. "The *Lark's* so full of uranium that her skin's bulging, so we've got power to burn. In that Galaxy there are—there *must* be—suns with habitable, possibly inhabited, planets. We'll find one such planet and land on it. Then we'll do with our might what our hands find to do."

"Such as?"

"Along what lines?" queried Dorothy and Crane simultaneously.

"Space ship, probably—*Two's* entirely too small to be of any account in intergalactic work," Seaton replied promptly. "Or maybe fourth- fifth- and sixth-order projectors; or maybe some kind of an ultra-ultra radio or projector. How do I know, from here? But there's thousands of things that maybe we can do—we'll wait until we get there to worry about which one to try first."

XV.

SEATON strode over to the control board and applied maximum acceleration. "Might as well start traveling, Mart," he remarked to Crane, who had for almost an hour been devoting the highest telescopic power of number six visiplate to spectroscopic, interferometric, and spectrophotometric studies of half a dozen selected nebulae. "No matter which one you pick out we'll have to have quite a lot of positive acceleration yet before we reverse to negative."

"As a preliminary measure, might it not be a good idea to gain some idea as to our present line of flight?" Crane asked dryly, bending a quizzical glance upon his friend. "You know a great deal more than I do about the hypothesis of linear departure of incompatible and incommensurable spaces, however, and so perhaps you already know our true course."

"Ouch! Pals, they got me!" Seaton clapped a hand over his heart; then, seizing his own ear, he led himself up to the switchboard and shut off the space drive, except for the practically negligible superimposed thirty-two feet per second which gave to the *Skylark's* occupants a normal gravitational force.

"Why, Dick, how perfectly silly!" Dorothy chuckled. "What's the matter? All you've got to do is to——"

"Silly, says you?" Seaton, still blushing, interrupted her. "Woman, you don't know the half of it! I'm just plain dumb, and Mart was tactfully calling my attention to the fact. Them's soft words that the slatlike string bean just spoke, but believe me, Red-Top, he packs a wicked wallop in that silken glove!"

"Keep still a minute, Dick, and look at the bar!" Dorothy protested. "Everything's on zero, so we must be still going straight up, and all you have to do to get back somewhere near our own Galaxy is to turn it around. Why didn't one of you brilliant thinkers—or have I overlooked a bet?"

"Not exactly. You don't know about those famous linear departures, but I do. I haven't that excuse—I simply went off half cocked again. You see, it's like this: Even if those gyroscopes could have retained their orientation unchanged through the fourth-dimensional translation, which is highly improbable, that line wouldn't mean a thing as far as getting back is concerned.

"We took one gosh-awful jump in going through hyperspace, you know, and we have no means at all of determining whether we jumped up, down, or sidewise. Nope, he's right, as usual—we can't do anything intelligently until he finds out, from the shifting of spectral lines and so on, in what direction we actually are traveling. How're you coming with it, Mart?"

"For really precise work we shall require photographs of some twenty

hours' exposure. However, I have made six preliminary observations, as nearly on rectangular coördinates as possible, from which you can calculate a first-approximation course which will serve until we can obtain more precise data."

"All right! Calcium H and calcium K—— Were they all type G?"

"Four of them were of type G, two were of type K. I selected the H and K lines of calcium because they were the most prominent individuals appearing in all six spectra."

"Fine! While you're taking your pictures I'll run them off on the calculator. From the looks of those shifts I'd say I could hit our course within five degrees, which is close enough for a few days, at least."

Seaton soon finished his calculations. He then read off from the great graduated hour-space and declination-circles of the gyroscope cage the course upon which the power bar was then set, and turned with a grin to Crane, who had just opened the shutter for his first time exposure.

"We were off plenty, Mart," he admitted. "The whole gyroscope system was rotated about ninety degrees minus declination and something like plus seven hours' right ascension, so we'll have to forget all our old data and start out from scratch with the reference planes as they are now. That won't hurt us much, though, since we haven't any idea where we are, anyway.

"We're heading about ten degrees or so to the right of that nebula over there, which is certainly a mighty long ways off from where I thought we were going. I'll put on full positive and point ten degrees to the left of it. Probably you'd better read it now, and by taking a set of observations, say a hundred hours apart, we can figure when we'll have to reverse acceleration.

"While you're doing that I thought I'd start seeing what I could do about a fourth-order projector. It'll take a long time to build, and we'll need one bad when we get inside that Galaxy. What do you think?"

"I think that both of those ideas are sound," Crane assented, and each man bent to his task.

CRANE took his photographs and studied each of the six key nebulae with every resource of his ultrarefined instruments. Having determined the *Skylark's* course and speed, and knowing her acceleration, he was able at last to set upon the power bar an automatically varying control of such a nature that her resultant velocity was directly toward the lenticular nebula nearest her former line of flight.

That done, he continued his observations at regular intervals—constantly making smaller his limit of observational error, constantly so altering the power and course of the vessel that the selected Galaxy would be reached in the shortest possible space of time consistent with a permissible final velocity.

And in the meantime Seaton labored upon the projector. It had been out of the question, of course, to transfer to tiny *Two* the immense mechanism which had made of *Three* a sentient, almost a living, thing; but, equally of course, he had brought along the force-band transformers and selectors, and as much as possible of the other essential apparatus. He had been obliged to leave behind, however, the very heart of the fifth-order installation—the precious lens of neutronium—and its lack was now giving him deep concern.

"What's the matter, Dickie? You look as though you had lost your last friend." Dorothy intercepted him one day as he paced about the narrow confines of the control room, face set and eyes unseeing.

"Not quite that, but ever since I finished that fourth-order outfit I've been

trying to figure out something to take the place of that lens we had in *Three*, so that I can go ahead on the fifth, but that seems to be one thing for which there is absolutely no substitute. It's like trying to unscrew the inscrutable —it can't be done."

"If you can't get along without it, why didn't you bring it along, too?"

"Couldn't."

"Why?" she persisted.

"Nothing strong enough to hold it. In some ways it's worse than atomic energy. It's so hot and under such pressure that if that lens were to blow up in Omaha it would burn up the whole United States, from San Francisco to New York City. It takes either thirty feet of solid inoson or else a complete force-bracing to stand the pressure. We had neither, no time to build anything, and couldn't have taken it through hyperspace even if we could have held it safely."

"Does that mean——"

"No. It simply means that we'll have to start at the fourth again and work up. I did bring along a couple of good big faidons, so that all we've got to do is find a planet heavy enough and solid enough to anchor a full-sized fourth-order projector on, within twenty light-years of a white dwarf star."

"Oh, is that all? You two'll do that, all right."

"Isn't it wonderful the confidence some women have in their husbands?" Seaton asked Crane, who was studying through number six visiplate and the fourth-order projector the enormous expanse of the strange Galaxy at whose edge they now were. "I think maybe we'll be able to pull it off, though, at that. Of course we aren't close enough yet to find such minutiae as planets, but how are things shaping up in general?"

"Quite encouraging! This Galaxy is certainly of the same order of magnitude as our own, and——"

"Encouraging, huh?" Seaton broke in. "If such a dyed-in-the-wool pessimist as you are can permit himself to use such a word as that, we're practically landed on a planet right now!"

"And shows the same types and varieties of stellar spectra," Crane went on, unperturbed. "I have identified with certainty no less than six white dwarf stars, and some forty yellow dwarfs of type G."

"Fine! What did I tell you?" exulted Seaton.

"Now go over that again, in English, so that Peggy and I can feel relieved about it, too," Dorothy directed. "What's a type-G dwarf?"

"A sun like our own old Sol, back home," Seaton explained. "Since we are looking for a planet as much as possible like our own Earth, it is a distinctly cheerful fact to find so many suns so similar to our own. And as for the white dwarfs, I've got to have one fairly close to the planet we land on, because to get in touch with Rovol I've got to have a sixth-order projector; to build which I've first got to have one of the fifth order; for the reconstruction of which I've got to have neutronium; to get which I'll have to be close to a white dwarf star. See?"

"Uh-huh! Clear and lucid to the point of limpidity—not." Dorothy grimaced, then went on: "As for me, I'm certainly glad to see those stars. It seems that we've been out there in absolutely empty space for ages, and I've been scared a pale lavender all the time. Having all these nice stars around us again is the next-best thing to being on solid ground."

AT THE EDGE of the strange Galaxy though they were, many days were required to reduce the intergalactic pace of the vessel to a value at which maneuvering was possible, and many more days passed into time before Crane announced the discovery of a sun

which not only possessed a family of planets, but was also within the specified distance of a white dwarf star.

To any Earthly astronomer, whose most powerful optical instruments fail to reveal even the closest star as anything save a dimensionless point of light, such a discovery would have been impossible, but Crane was not working with Earthly instruments. For the fourth-order projector, although utterly useless at the intergalactic distances with which Seaton was principally concerned, was vastly more powerful than any conceivable telescope.

Driven by the full power of a disintegrating uranium bar, it could hold a projection so steadily at a distance of twenty light-years that a man could manipulate a welding arc as surely as though it was upon a bench before him —which, in effect, it was—and in cases in which delicacy of control was not an object, such as the present quest for such vast masses as planets, the projector was effective over distances of many hundreds of light-years.

Thus it came about that the search for a planetiferous sun near a white dwarf star was not unduly prolonged, and *Skylark Two* tore through the empty ether toward it.

Close enough so that the projector could reveal details, Seaton drove projections of all four voyagers down into the atmosphere of the first planet at hand. That atmosphere was heavy and of a pronounced greenish-yellow cast, and through it that fervent sun poured down a flood of livid light upon a peculiarly dead and barren ground—but yet a ground upon which grew isolated clumps of a livid and monstrous vegetation.

"Of course detailed analysis at this distance is impossible, but what do you make of it, Dick?" asked Crane. "In all our travels, this is only the second time we have encountered such an atmosphere."

"Yes; and that's exactly twice too many." Seaton, at the spectroscope, was scowling in thought. "Chlorin, all right, with some fluorin and strong traces of oxides of nitrogen, nitrosyl chloride, and so on—just about like that one we saw in our own Galaxy that time. I thought then and have thought ever since that there was something decidedly fishy about that planet, and I think there's something equally fishy about this one."

"Well, let's not investigate it any further, then," put in Dorothy. "Let's go somewhere else, quick."

"Yes, let's," Margaret agreed, "particularly if, as you said about that other one, it has a form of life on it that would make our grandfather's whiskers curl up into a ball."

"We'll do that little thing; we haven't got *Three's* equipment now, and without it I'm no keener on smelling around this planet than you are," and he flipped the projection across a few hundred million miles of space to the neighboring planet. Its air, while somewhat murky and smoky, was colorless and apparently normal, its oceans were composed of water, and its vegetation was green. "See, Mart? I told you something was fishy. It's all wrong—a thing like that can't happen even once, let alone twice."

"According to the accepted principles of cosmogony it is of course to be expected that all the planets of the same sun would have atmospheres of somewhat similar composition," Crane conceded, unmoved. "However, since we have observed two cases of this kind, it is quite evident that there are not only many more suns having planets than has been supposed, but also that suns capture planets from each other, at least occasionally."

"Maybe—that would explain it, of course. But let's see what this world looks like—see if we can find a place

to sit down on. It'll be nice to live on solid ground while I do my stuff."

He swung the viewpoint slowly across the daylight side of the strange planet, whose surface, like that of Earth, was partially obscured by occasional masses of cloud. Much of that surface was covered by mighty oceans, and what little land there was seemed strangely flat and entirely devoid of topographical features.

The immaterial conveyance dropped straight down upon the largest visible mass of land, down through a towering jungle of fernlike and bamboolike plants, halting only a few feet above the ground. Solid ground it certainly was not, nor did it resemble the watery muck of our Earthly swamps. The huge stems of the vegetation rose starkly from a black and seething field of viscous mud—mud unrelieved by any accumulation of humus or of débris—and in that mud there swam, crawled, and slithered teeming hordes of animals.

"What perfectly darn funny-looking mud puppies!" Dorothy exclaimed. "And isn't that the thickest, dirtiest, gooiest mud you ever saw?"

"Just about," Seaton agreed, intensely interested. "But those things seem perfectly adapted to it. Flat, beaver tails; short, strong legs with webbed feet; long, narrow heads with rooting noses, like pigs; and heavy, sharp incisor teeth. But they live on those ferns and stuff—that's why there's no underbrush or dead stuff. Look at that bunch working on the roots of that big bamboo over there. They'll have it down in a minute—there she goes!"

THE GREAT trunk fell with a crash as he spoke, and was almost instantly forced beneath the repellant surface by the weight of the massed "mud puppies" who flung themselves upon it.

"Ah, I thought so!" Crane remarked. "Their molar teeth do not match their incisors, being quite Titanotheric in type. Probably they can assimulate lignin and cellulose instead of requiring our usual nutrient carbohydrates. However, this terrain does not seem to be at all suitable for our purpose."

"I'll say it doesn't. I'll scout around and see if we can't find some high land somewhere, but I've got a hunch that we won't care for that, either. This murky air and the strong absorption lines of SO_2 seem to whisper in my ear that we'll find some plenty hot and plenty sulphurous volcanoes when we find the mountains."

A few large islands or small continents of high and solid land were found at last, but they were without exception volcanic. And those volcanoes were not quiescent. Each was in constant and furious eruption.

"Well, I don't see any place around here either fit to live in or solid enough to anchor an observatory onto," Seaton concluded, after he had surveyed the entire surface of the globe. "I think we'd better flit across to the next one, don't you, folks?"

Suiting action to word, he shot the beam to the next nearest planet, which chanced to be the one whose orbit was nearest the blazing sun, and a mere glance showed that it would not serve the purposes of the Terrestrials. Small it was, and barren: waterless, practically airless, lifeless; a cratered, jagged, burned-out ember of what might once have been a fertile little world.

The viewpoint then leaped past the flaming inferno of the luminary and came to rest in the upper layers of an amtosphere.

"Aha!" Seaton exulted, after he had studied his instruments briefly. "This looks like home, sweet home to me. Nitrogen, oxygen, some CO_2, a little water vapor, and traces of the old familiar rare gases. And see the oceans, the clouds, and the hills? Hot dog!"

As the projection dropped toward the new world's surface, however, making

possible a detailed study, it became evident that there was something abnormal about it. The mountains were cratered and torn; many of the valleys were simply desolate expanses of weathered lava, tuff, and breccia; and, while it seemed that climatic conditions were eminently suitable, of animal life there was none.

And it was not only the world itself that had been outraged. Near a great inland lake there spread the ruins of what had once been a great city; ruins so crumbled and razed as to be almost unrecognizable. What had been stone was dust, what had been metal was rust; and dust and rust alike were now almost completely overgrown by vegetation.

"Hm-m-m!" Seaton mused, subdued. "There *was* a near-collision of planet-bearing suns, Mart; and that chlorin planet was captured. This world was ruined by the strains set up—but surely they must have been scientific enough to have seen it coming? Surely they must have made plans so that *some* of them could have lived through it?"

He fell silent, driving the viewpoint hither and thither, like a hound in quest of a scent. "I thought so!" Another ruined city lay beneath them; a city whose buildings, works, and streets had been fused together into one vast agglomerate of glaringly glassy slag, through which could be seen unmelted fragments of strangely designed structural members. "Those ruins are fresh—that was done with a heat ray, Mart. But who did it, and why? I've got a hunch—wonder if we're too late—if they've killed them all off already?"

Hard-faced now and grim, Seaton combed the continent, finding at last what he sought.

"Ah, I thought so!" he exclaimed, his voice low but deadly. "I'll bet my shirt that the chlorins are wiping out the civilization of that planet—probably people more or less like us. What d'you say, folks—do we declare ourselves in on this, or not?"

"I'll tell the cockeyed world—— I believe that we should—— By all means——" came simultaneously from Dorothy, Margaret, and Crane.

"I knew you'd back me up. Humanity *über alles—homo sapiens* against all the vermin of the universe! Let's go, *Two*—do your stuff!"

AS *TWO* hurtled toward the unfortunate planet with her every iota of driving power, Seaton settled down to observe the strife and to see what he could do. That which lay beneath the viewpoint had not been a city, in the strict sense of the word. It had been an immense system of concentric fortifications, of which the outer circles had long since gone down under the irresistible attack of the two huge structures of metal which hung poised in the air above. Where those outer rings had been there was now an annular lake of boiling, seething lava. Lava from which arose gouts and slender pillars of smoke and fume; lava being volatilized by the terrific heat of the offensive beams and being hurled away in flaming cascades by the almost constant detonations of high-explosive shells; lava into which from time to time another portion of the immense fortress slagged down—put out of action, riddled, and finally fused by the awful forces of the invaders.

Even as the four Terrestrials stared in speechless awe, an intolerable blast of flame burst out above one of the flying forts and down it plunged into the raging pool, throwing molten slag far and wide as it disappeared beneath the raging surface.

"Hurray!" shrieked Dorothy, who had instinctively taken sides with the defenders. "One down, anyway!"

But her jubilation was premature. The squat and monstrous fabrication burst upward through that flaming sur-

face and, white-hot lava streaming from it in incandescent torrents, it was again in action, apparently uninjured.

"All fourth-order stuff, Mart," Seaton, who had been frantically busy at his keyboard and instruments, reported to Crane. "Can't find a trace of anything on the fifth or sixth, and that gives us a break. I don't know what we can do yet, but we'll do something, believe me!"

"Fourth order? Are you sure?" Crane doubted. "A fourth-order screen would be a zone of force, opaque and impervious to gravitation, whereas those screens are transparent and are not affecting gravity."

"Yeah, but they're doing something that we never tried, since we never used fourth-order stuff in fighting. They've both left the gravity band open—it's probably too narrow for them to work through, at least with anything very heavy—and that gives us the edge."

"Why? Do you know more about it than they do?" queried Dorothy.

"Who and what are they, Dick?" asked Margaret.

"Sure I know more about it than they do. I understand the fifth and sixth orders, and you can't get the full benefit of any order until you know all about the next one. Just like mathematics—nobody can really handle trigonometry until after he has had calculus. And as to who they are, the folks in that fort are of course natives of the planet, and they may well be people more or less like us. It's dollars to doughnuts, though, that those vessels are manned by the inhabitants of that interloping planet—that form of life I was telling you about—and it's up to us to pull their corks if we can. There, I'm ready to go, I think. We'll visit the ship first."

The visible projection disappeared and, their images now invisible patterns of force, they stood inside the control room of one of the invaders. The air bore the faint, greenish-yellow tinge of chlorin; the walls were banked and tiered with controlling dials, meters, and tubes; and sprawling, lying, standing, or hanging before those controls were denizens of the chlorin planet. No two of them were alike in form. If one of them was using eyes he had eyes everywhere; if hands, hands by the dozen, all differently fingered, sprouted from one, two, or a dozen supple and snaky arms.

But the inspection was only momentary. Scarcely had the unseen visitors glanced about the interior when the visibeam was cut off sharply. The peculiar beings had snapped on a full-coverage screen and their vessel, now surrounded by the opaque spherical mirror of a zone of force, was darting upward and away—unaffected by gravity, unable to use any of her weapons, but impervious to any form of matter or to any ether-borne wave.

"Huh! 'We didn't come over here to get peeked at,' says they." Seaton snorted. "Amœbic! Must be handy, though, at that, to sprout eyes, arms, ears, and so on whenever and wherever you want to—and when you want to rest, to pull in all such impedimenta and subside into a senseless green blob. Well, we've seen the attackers, now let's see what the natives look like. They can't cut us off without sending their whole works sky-hooting off into space."

The visibeam sped down into the deepest sanctum of the fortress without hindrance, revealing a long, narrow control table at which were seated men—men not exactly like the humanity of Earth, of Norlamin, of Osnome, or of any other planet, but undoubtedly men, of the genus *homo*.

"You were right, Dick." Crane the anthropologist now spoke. "It seems that on planets similar to Earth in mass, atmosphere, and temperature, wherever situated, man develops. The ultimate

genes must permeate universal space itself."

"Maybe—sounds reasonable. But did you see that red light flash on when we came in? They've got detectors set on the gravity band—look at the expression on their faces."

EACH of the seated men had ceased his activity and was slumped down into his chair. Resignation, hopeless yet bitter, sat upon lofty, domed brows and stared out of large and kindly eyes.

"Oh, I get it!" Seaton exclaimed. "They think the chlorins are watching them—as they probably do most of the time—and they can't do anything about it. Should think they could do the same—or could broadcast an interference—I could help them on that if I could talk to them—wish they had an educator, but I haven't seen any——" He paused, brow knitted in concentration. "I'm going to make myself visible to try a stunt. Don't talk to me; I'll need all the brain power I've got to pull this off."

As Seaton's image thickened into substance its effect upon the strangers was startling indeed. First they shrank back in consternation, supposing that their enemies had at last succeeded in working a full materialization through the narrow gravity band. Then, as they perceived that Seaton's figure was human, and of a humanity different from their own, they sprang to surround him, shouting words meaningless to the Terrestrials.

For some time Seaton tried to make his meaning clear by signs, but the thoughts he was attempting to convey were far too complex for that simple medium. Communication was impossible and the time was altogether too short to permit of a laborious learning of language. Therefore streamers of visible force shot from Seaton's imaged eyes, sinking deeply into the eyes of the figure at the head of the table.

"Look at me!" he commanded, and his fists clenched and drops of sweat stood out on his forehead as he threw all the power of his brain into that probing, hypnotic beam.

The native resisted with all his strength, but not for nothing had Seaton had superimposed upon his already-powerful mind a large portion of the phenomenal brain of Drasnik, the First of Psychology of Norlamin. Resistance was useless. The victim soon sat relaxed and passive, his mind completely subservient to Seaton's, and as though in a trance he spoke to his fellows.

"This apparition is the force-image of one of a group of men from a distant Solar System," he intoned in his own language. "They are friendly and intend to help us. Their space ship is approaching us under full power, but it cannot get here for many days. They can, however, help us materially before they arrive in person. To that end, he directs that we cause to be brought into this room a full assortment of all our fields of force, transmitting tubes, controllers, force-converters—in short, the equipment of a laboratory of radiation —— No, that would take too long. He suggests that one of us escort him to such a laboratory."

To be continued.

Seaton has come to Valeron! And now begins a bitter, colossal struggle—all the scientist's powers and amazing ingenuity matched against the repellant, mightily armed civilization of Valeron's invaders.

The Conclusion of:

LO! by Charles Fort

IV.

I AM thinking of an abstraction that was noted by Aristotle, and that was taken by Hegel, for the basis of his philosophy:

That wherever there is a conflict of extremes, there is an outcome that is not absolute victory on either side, but is a compromise, or what Hegel called "the union of complementaries."

Our own controversy is an opposition of extremes:

That this earth moves swiftly;

That this earth is stationary.

In terms of controversies and their outcomes, I cannot think that either of these sides can be altogether right, or will absolutely defeat the other, when comes some way of finding out and settling this issue.

The idea of stationariness came first. Then, as a sheer, mechanical reaction—inasmuch as Copernicus had not one datum that a conventionalist of to-day would accept as meaning anything—came the idea of a swiftly moving earth. An intermediate view will probably appear and prevail.

My own notion of equilibrium between these extremes, backed up with our chapters of data, is that, within a revolving, starry shell that, relatively to the extravagances of the astronomical extremists, is not far away, this roundish earth is almost central, but is not absolutely stationary, having various slight movements. Perhaps it does rotate, but with a period of a year. Like everybody else, I have my own notions upon what constitutes reasonableness, and this is my idea of a compromise.

The primary view had for its support the highest mathematical authoritativeness of its era. Now, so has the secondary view. Mathematics has been as subservient to one view as the other.

Mostly our data have been suggestive, or correlative, but it may be that there are visual indications of a concave land in the sky, or of a substantial shell around this earth. There are dark places in the sky, and some of them have the look of land. They are called "dark nebulae." Some astronomers have speculated upon them, as glimpses of a limiting outline of a system as a whole.

See back to Dolmage, quoted upon the subject.

My own notion is of a limiting, outlining substance that I call a "shell." "Dark nebulae" have the look of bare, or starless, patches of a shell. Some of them may be formations that are projections from a shell. They hang like superstalactites in a vast and globular cave. At least one of these appearances has the look of a mountain peak.

In several books by astronomers, published lately, plates of this object have appeared. See Duncan's "Astronomy." It is known as the Horsehead nebula. It stands out, as a vast, sullen refusal to mix into a frenzy of phosphorescent confetti. It is a solid-looking gloom. Over its summit comes light, like the fringe of dawn topping a mountain. Something is shining behind this formation, but penetrates no more than it would shine through a mountain.

It may be that relatively there are few stars—that hosts of tiny lights in the sky are reflections, upon irregularities of the shell-land, from large stars.

AMONG expressions that I have not developed is one that is suggested by a circumstance that astronomers consider strange. This is that some variable stars have a period of about a year. Just what variations of stars that are said to be trillions of miles away could have to do with a period upon this ultra-remote earth cannot be conceived of in orthodox terms. The suggestion is that these lights, with variations corresponding with advances and recessions of the sun, moving spirally around this almost stationary earth, are reflections of sunlight from points of land, or from lakes in extinct or dormant craters. It may be that many variations of light that have been attributed to "companions" are tidal phenomena in celestial lakes that shine as reflections from the sun, or from other stars, which may be lakes of molten lava.

There is a formation in the constellation Cygnus that has often been noted. It is faintly luminescent, but this light, according to Professor Hubble, is a reflection from the star Deneb. It is shaped like North America, and it is known as the America nebula. Out from its Gulf of Mexico are islands of light. One of these may be a San Salvador some day.

Like Alaska to birds from the north, the Horsehead nebula stands out from its background, like something to fly to.

Star after star after star has blazed a story, sometimes publishing tragedy on earth, illustrated with spectacles in the heavens. But when transcribed into human language, these communications are depopularized with "determinations" and "pronouncements." So our tribes have left these narratives of fires and smokes and catastrophes to the wise men, who have made titanic tales unintelligible with their little technical jargons. The professionals will not unprofessionalize; they will not give up their system.

There's a fire in the sky, and ashes and smoke and dust reach this earth, as sometimes, after an eruption of Vesuvius, discharges reach Paris. There may be volcanoes in a land of the sky, so close to this earth that, if intervening space is not airless and most intensely cold, an expedition could sail away in a dash to the stars that would be a bold and magnificent trifle.

V.

BESIDES the new star, which was an object so conspicuous that it was discovered widely, except by astronomers, there was another astronomical occurrence in the month of June, 1918—an eclipse of the sun. It was observed in Oregon. We can't expect such a check-up as when Coogan's Bluff and the Consolidated Gas Co. got into astronomy, but Oregonians set their alarm clocks and looked up at the sky. See Mitchell's "Eclipses of the Sun," page 67—the astronomers admitted an error of fourteen seconds in their prediction.

My own opinion is that an error of only fourteen seconds is a very creditable approximation. But it is a huge and grotesque blunder, when compared with the fairylike refinements that the astronomers dream are theirs, in matters that cannot be so easily checked up.

There are persons who do not believe in ordinary fortune tellers. Yet without a quiver in their credulities, they read of an astronomical gypsy who tells the fortunes of a star for 100,000,000,000 years, though, according to conventionality, that star is 60 X 60 X 24 X 365 X 100,000 times farther away than is the moon, motions of which cannot be exactly foretold.

No star has ever been seen to cross another star, but just such changes as have been seen in volcanoes of this earth have been seen in stars. Mostly, in their books, astronomers, telling of what they call "proper motion," do all

that they can to give an impression of the stars as moving with tremendous velocities, but here is Newcomb ("Astronomy for Everybody," page 327) quoted upon the subject: "If Ptolemy should come to life, after his sleep of nearly eighteen hundred years, and be asked to compare the heavens as they are now with those of his time, he would not be able to see the slightest difference in the configuration of a single constellation."

And if Ptolemy should come back and be asked to compare the Mediterranean lands as they are now with those of his time, he would not be able to see the slightest difference in the configuration of any land—even though erosions of various kinds have been constant.

What Orion was, Orion is, in the sense that what the configuration of Italy was, it now is—in the sense that in all recorded time Italy has been booting Sicily, but has never scored a goal.

There is no consistency, and there is no inconsistency in our hyphenated state of phenomenal being: there is consistency-inconsistency. Everything that is inconsistent with something is consistent with something else. In the oneness of allness, I am, in some degree or aspect, guilty of, or infected with, or suffering from, everything that I attack. Now, I, too, am aristocratic. Let anybody else who is as patrician as I now am read this book and contrast the principles of orthodox astronomy with the expressions in this book, and ask himself:

Which is the easier and lazier way, with the lesser necessity for effort, and with the lesser need for the use of brains, and therefore the more aristocratic view:

That for, say eighteen hundred years, stars have scarcely moved, because though changes in them have often been seen, they are too far away for changes in them to be observed?

Or that the stars have scarcely moved, because they are points in a shell-like formation that holds them in place?

However, the orthodox visualization of stars rushing at terrific velocities, in various directions, and never getting anywhere, is so in accordance with the unachievements of all other phenomenal things that I'd feel my heresies falter were it not for other data——

But what of other data—or of other circumstances?

In this day of everybody's suspicion against "circumstantial evidence," just what is not generally realized is that orthodox astronomy is founded upon nothing but circumstantial evidence. Also, all our data, and repetitions and agreements of data, are nothing but circumstantial evidence. Simply mention "circumstantial evidence" relatively, say, to a murder trial, and most of us look doubtful. Consequently I have only expressions and acceptances.

Other data—or, let us say, other circumstances——

Last of March, 1928—that Nova Pictoris had split into two parts.

Part was seen to have moved from part, as divisions occur in this earth's volcanoes.

So then, when changes of positions of stars do occur, the stars are not so far away that changes of position cannot be seen.

TEN little astronomers squinting through a tube—or more characteristically employed—or looking at a mirror. They had been told, upon the highest authority, that the star Capella had a companion. Said they—or announced they—they saw it—or perceived it.

Seeming to have a need for something to be furious about, I now turn my indignations upon "companion stars." Most persons have, in their everyday affairs, plenty to annoy them: but it seems that I must have something of exclusiveness to my annoyances. If stars are volcanoes in a concave land,

surrounding this earth, the notion of "companion stars" perhaps enrages me, because I do not visualize one volcano revolving around another volcano. If some stars do revolve around other stars, I may as well give up this book, as a whole—or I shall have to do some explaining.

Which won't be much trouble. Explaining is equilibrating. That is what all things phenomenal are doing. I now have a theory that once upon a time our existence was committed as a bad error, and that everything in it has been excusing itself, or has in one way or another been equilibrating, ever since. It is as natural to a human being to explain as it is to a lodestone to adjust to a magnet.

Let anybody look up "determinations" upon the "dark companion" of Algol, for instance. He will find record not of a theory, but of theory after theory replacing one another. In the matter of the light ones, let him look up data upon the "light companion" of Sirius. He will read in the textbooks that around Sirius a light star revolves, with a most accurately known period, which demonstrates the soundness of mathematical astronomy. But in scientific journals, which are not so uncompromisingly committed to propaganda, he will read that this is not so. A faint light has, at various times, been reported near Sirius, in positions that do not accord with the calculated orbit. For no mention of this discrepancy, read the books that reach the general public.

March, 1928—the split of Nova Pictoris. There was cataclysm in a southern constellation. At the same time there were catastrophes in southern parts of this earth. See back to other expressions upon seeming relations between parts of this earth and parts of the sky that would be nearest to each other if the stars are points in a shell of land that is not enormously far away, but could not be appreciably nearer if the stars were trillions of miles away. I take all data from New York newspapers.

Quakes in Italy, and a glare in the sky at the time—March 31st—of a quake in Smyrna—"sky aflame." The heaviest rain in fifty years poured in Honduras, April 9th—Peru shaking, this day—such a fall of snow in Chile that two hundred persons and thousands of farm animals were reported to be buried in the drifts—quakes and panics in Mexico—

Orthodoxy—all this by mere coincidence——

Our expression—that nebulous rings were going out from Nova Pictoris, just as rings of smoke and dust go out from Vesuvius, during an eruption.

The 14th of April was the day of the Bulgarian devastations. Quakes continuing in Bulgaria—quakes in Mexico—towns rocking in southern Mexico—quakes continuing in Peru. Quakes in Greece, on the 19th—a violent snowstorm in Poland, this day. Torrents were pouring upon the quaking land of Bulgaria. A De Ballore, or a Davison, or a Milne, would not mention these torrents, in an account of this quake. The severest shock ever recorded in Johannesburg, South Africa, occurred upon the 21st. The next day, Corinth, Greece, was wrecked, and torrents fell from the sky at the time of this quake.

Nova Pictoris broke into four parts—and the cities of Greece wailed rushes of people. Seeming discharges moving out from the new star—and "A five-hour rain of mud filled streets ankle-high, causing terror at Lemburg and Cernowitz, to-day" (New York *Sun,* April 27th).

November 28, 1930—an enormous fall from the sky of dust and mud in France. I shall not get perhaps all worked up again about this, but I mention that it was attributed to a hurricane in the Sahara desert.

December 5, 1930—the poisonous gas,

in Belgium. See back to the account, in this book.

Accept that these two phenomena were probably volcanic discharges from regions external to this earth—if for them there is no terrestrial explanation—one in France and one in Belgium—arriving relatively near each other, but a week apart—and here is another of our data of this earth's stationariness.

This earth broke out, as if responsively to disturbances somewhere else—volcanic eruptions and disastrous quakes.

December 24-26—violent quakes in Argentina and in Alaska—and, between these far-distant places, there was a spectacular arrival of something that may have been a volcanic bomb from a stellar volcano. New York *Times*, December 26, 1930—the great meteor that was seen and heard in Idaho. "The crash, heard for miles, was described as 'like an earthquake.'"

The deluge that was "only a coincidence," poured upon the quaking land of Argentina. "Rain fell in such torrents that the water was three feet deep in several parts of Mendoza City." A "strange glow" was seen in the sky. "Great spears of colored lights flashed across the sky."

Catastrophes and deluges—and if we can accept that around this earth there is only a thin zone of extreme coldness, which, by the stresses of storms and other variations, may often be penetrated by terrestrial evaporations, so that unless replenished from reservoirs somewhere else this earth would go dry, we can understand a mechanism of necessary transportations of floods from the stars to this earth.

Give me more data for thinking that around this earth there is a starry shell that isn't far away, and here is the base for a correlation of all phenomena.

VI.

STAR after star after star—and the signs that there were, at the times of them. Quake after quake after quake—and the sights in the sky, at the times of them. Star after quake after deluge—the sky boils with significances—there are tempests of indications.

There's a beam of light in the sky, and it dips into a star. Spattering ponds of ink, it scribbles information. The story is that a vast and habitable land surrounds this earth. It is fertile, if showers of organic substances that have fallen from the sky came from there. The variable stars are intermittent signs that are advertising enormous real-estate opportunities. The story is declaimed by meteors, but most of us stolid ones aren't going to be persuaded by any such sensational appeal to the emotions. The story is more obscurely told with clouds of dust that strew Europe. Most of us can't take a hint, the size of a continent.

The searchlights of the sun play upon a celebration in the sky. It has been waiting ages to mean something. Just at present known as the Milky Way, it's the Broadway of the Sky, and some day explorers from this earth may parade it——

If this earth is stationary.

According to a great deal in this book, that may be a matter of no importance, nor bearing. If we accept that teleportation, as a "natural force" exists, and suspect that some human beings have known this and have used it; and if we think that the culmination of a series of tele-operations will be the commercial and recreational teleportation of objects and beings, we are concerned little with other considerations and conceive of inhabitants of this earth willing themselves—if that's the way it's done—to Mars, or the moon, or Polaris.

But I take for a proposition that there is an underlying irony, if not sadism, in our existence, which rejoices in driving the most easily driven beings of this earth into doing, at enormous pain and expense, the unnecessary—the building of complicated telegraph systems, with

the use of two wires—then reducing to one wire—then the discovery that the desired effects could be achieved wirelessly. Labors and sufferings of early arctic explorers to push northward over piles of ice at a rate of three of four miles a day—then Byrd does it with a whir.

Consequently, I concern myself with data for what may be a new field of enormous labors and sufferings, costs of lives and fortunes, misery and bereavements, until finally will come awareness that all this is unnecessary.

Upon this basis of mechanical and probably unnecessary voyagings—unless to something disastrous of the beings of this earth are necessary—the most important consideration is whether this earth is stationary. There can be no mechanical or suffering exploration from something that is somewhere one day, and the next day 60 X 60 X 24 X 19 miles away from there.

Then comes the subject of conditions surrounding this earth. If common suppositions are right, or if this earth is surrounded by a void that is intensely cold, penetration to anywhere beyond would probably be, anyway at present, impossible.

I compare ideas upon outer space with former ideas upon spaces in the arctic regions. Resistances to the idea of exploration are similar. But in the wintertime, arctic regions are not colder than are some of the inhabited parts of Canada. Stefansson, the arctic explorer, has written that the worst blizzards ever seen by him were in North Dakota. Prevailing ideas as to the intensity of cold surrounding this earth, and preventing exploration, may be as far astray as are prevailing ideas as to arctic coldness.

Outer space may not be homogeneously cold, and may be zoned, or pathed, with warm areas. Everything of which one knows little has the guise of homogeneousness. If anybody had a homogeneous impression of anything, that is something that he is going to be surprised about.

In the London *Daily Mail*, January 29, 1924, Alan Cobham tells of one of his flights in India. "The air was quite warm at 17,000 feet, but as we descended to lower altitudes, it became gradually cooler, and, at 12,000 feet it was icy cold."

"The higher the colder" is a fixed idea, just as formerly was the supposition that the farther north the colder the atmosphere. Many reports by aviators and mountain climbers agree. Everybody who does anything out of the ordinary has to think that he suffered. It is one of his compensations. But fixed ideas have a way of not staying fixed.

I'd like to know how astronomers get around their idea that comets are mostly of a gaseous composition, if gases would solidify at the temperature in which they suppose those comets to be moving.

But stationariness—and what's the good of any of these speculations and collections of data, if by no conceivable agility could a returning explorer board a world scooting away from him at a rate of nineteen miles a second?

IN EARLY times, upholders of the idea of stationariness of this earth argued that a swiftly moving planet would leave its atmosphere behind. But it was said that the air partakes of the planet's motions. Nevertheless, it was agreed that, far from this earth's surface, air, if existing, would not partake of the motions. No motions of this earth away from them have ever been detected by aviators, but it is said that they have not gone up high enough.

But will an aviator, starting northward, from somewhere near the equator, partaking, we'll say, of an axial swing of one thousand miles an hour, making for a place where the swing is, we'll say, eight hundred miles an hour, be opposed by the westward motion that he started

with, amounting to two hundred miles an hour, at his destination? How could he ever get there without consciously opposing this transverse force from the beginning of his flight?

In the winter of 1927-28, flying south, and then north, Colonel Lindbergh reported no indication of different axial velocities. Whether this earth is stationary, or not, his experience was the same as it would be if this earth was stationary. Or Admiral Byrd over the south pole of this earth. From a point of this earth, theoretically of no axial motion, he flew northward. He flew over land, which, relatively to his progress, spun with increasing velocity, according to the conventionalists.

It cannot be said that the air around him was strictly partaking of this alleged motion, because gusts were blowing in various directions. Admiral Byrd started northward, from a point of no axial swing, partaking, himself, of no axial swing, and as he traveled northward the land underneath him did not swing away from him. The air was moving in various directions.

There is another field of data. There have been occurrences in the sky which, according to conventionalists, destroy the idea of the stationariness of this earth and prove its motions. Trying to prove anything is no attempt of mine.

Rather often have been observed luminous night clouds, or night clouds that shine, presumably by reflected sunlight, but with the sun so far below the horizon of observers upon this earth that so to reflect its light the clouds would have to be fifty or sixty miles high, according to calculations.

At this height, it is conceded, whatever air there may be does not partake of this earth's motions. If this earth is rotating from west to east, these distant clouds, not partaking of terrestrial motion, would seem to move, as left behind, from east to west For an article upon this subject, see the New York *Times,* April 8, 1928.

The statement that such clouds do not partake, and do seem to move from east to west, has been published by conventionalists. To an observer in Central Europe, they should, as left behind, seem to move from east to west, at a rate of about five hundred miles an hour by terrestrial rotation. The statement has been made that one of these clouds was seen to "move," from east to west, the way it should "move," at exactly the rate that should be.

I make the statement that luminous night clouds have moved north, south, east, and west, sometimes rapidly, and sometimes slowly. If somebody can, with data that will have to be accepted, show that, more than once, luminous night clouds have moved from east to west, at a rate of five hundred miles an hour in a latitude where they "should" move at a rate of five hundred miles an hour, I shall be glad to regret that I have backed the wrong theory—except that you can't down any theorist so easily or at all—and up I'll bob, pointing out that this is another of the *shoulds* that *shouldn't,* and that the conventionalists forgot about compounding their five hundred miles an hour with this earth's supposed orbital motion of nineteen miles a second.

All data upon this subject that I know anything of are interpretable as indications that this earth is stationary. For instance, look up, in "Nature" and other English and French scientific journals, observations upon the great meteor train of February 22, 1909. This appearance was thought to be as high as any luminous night cloud has been thought to be. It was so high that it was watched in France and in England.

Here was something, which, because it came from externality, was not partaking of any of this earth's supposed motions. Then it should have shot away from observers, by the compound-

ing of two velocities. Whether it came to a stationary earth or not, it hung in the sky, as if it had come to a stationary earth, drifting considerably, but remaining in sight, about two hours.

According to this datum—and it is only one of many—an explorer could go up from this earth fifty or sixty miles, and though, according to orthodox pronouncements, the earth would spin away from him, the earth would not spin away from him.

THERE are data for thinking that aviators, who have gone up from the surface of this earth, as far as they supposed they could go, have missed entering conditions that, instead of being cold, may be even warmish, and may exist all the way to a not so very remote shell of stars.

An expression of mine is that all human achievements are compounded with objectives. Let some one go without food for a week, and that is a record of human endurance. Some one else makes his objective a week and a day, and achieves, in a dying condition. The extension goes on, and some one lives a month without food and reaches the limit of human endurance. Aviators have set their minds upon surpassing the records of other aviators. It is possible that, with its objective a star, an expedition from this earth could, by merely reaching the limit of human endurance, arrive there.

See "Nature," February 27, 1908, and following issues—experiments with balloons that carried temperature-recording instruments. According to Mr. W. H. Dines, about thirty balloons which had been sent up in Great Britain, in June, 1907, had moved through increasing coldness, then coming to somewhat warmer regions. This change was recorded at a height of about 40,000 feet.

"Monthly Weather Review," 1923, page 316—that, away from this earth, the temperature falls only to a height of about seven miles, where it is from sixty to seventy degrees below zero—Fahrenheit. "But from this altitude to as high as balloons have gone, which is about fifteen miles, the temperature has remained about the same."

It is said that, according to observations upon light-effects of meteor trains, there are reasons for thinking that, in their zone of from thirty to fifty miles above this earth's surface, conditions are mild, or not even freezing.

For data that may indicate, in another field of observations, that, not enormously far away, there is a shell around this earth, see the newspapers of August 20, 1925. According to data, collected by the Naval Research Laboratory there is something, somewhere in the sky, that is deflecting electromagnetic waves of wireless communications, in a way that is similar to the way in which sound waves are sent back by the dome of the Capitol, at Washington.

The published explanation is that there is an "ionized zone" around this earth. Those waves are rebounding from something. More was published in the newspapers, May 21, 1927.

The existence of "a ceiling in the sky" had been verified by experiments at Carnegie Institution. September 5, 1930—a paper read by Professor E. V. Appleton, at a meeting of the British Association for the Advancement of Science. The "ionized zone" is not satisfactory. "The subject is as puzzling as it is fascinating, and no decisive answer to the problem can be given at present."

From Norway had been reported experiments upon short-wave transmissions, which had been reflected back to this earth. They had come back, as if from a shell-like formation, around this earth, not unthinkably far away.

THE END

Counter-challenge

Dear Editor:

A certain reader, in the discussions column of the September issue, I see, has taken exception to my statement in the July issue to the effect that in science-fiction there should be absolute freedom of thought. The fact (if fact it be) is forwarded that such freedom would result in degeneracy of science-fiction in general and the installation of wild and rambling fantasy. I am afraid that I cannot see where there would be any more danger in a course of absolute freedom in this realm, which most certainly needs it, than in any other. No matter where freedom is found, there, too, is abuse of it. That is to be expected. But with the excellent editorship such as is found in Astounding Stories, there should be nothing to fear. And, I ask, is it fair to clamp down on all just because of the actions of a few? Oliver Cromwell once said (pertaining to another matter, but quite applicable here): "It is not only presumptuous but foolish to deny a man a privilege on the assumption that he may abuse it; when he doth, then punish."

Certainly, my critic will admit that the old policy of science-fiction magazines was hardly desirable. There was a set formula, and all stories which did not fit the editorial yardstick were turned out into the cold. The old Astounding was a beautiful example of this policy. On the other hand, look at the new Astounding. Does that show any signs of degeneracy? If it does, I for one fail to see it. Yet, I will wager that you cannot pick out more than three stories in any issue since April which would have been accepted by the old magazine.

Super-science is far beyond the pale of ordinary science-fiction. The latter is most lamentably blocked by so-called standards, while the former is unrestrained. All that is required in the former is that the science be logically developed, and that the hypothetical foundation be sound. And, as was brought up in the *Colossus* argument, the author should make his principle clear and show what evidence he has pointing to his conclusions.

As far as weird tales, and the plunges into pure fantasy go, does not my critic realize that the greatest of all science-fiction tales, the immortal *Moon Pool*, was nothing more or less than pure fantasy? The same can be said with the best works of Merritt, Williamson, Smith, and H. P. Lovecraft. C. L. Moore, for instance, who will make her debut to Astounding Stories readers in the October issue, has been hailed as a rising star in the well-studded sky. Who is better fitted to delve into the unexplored regions of space, mind and matter than these?

If it is not asking too much, Mr. Editor, I would like you to state your opinion on this matter in an early issue, and would appreciate the viewpoint of my fellow fans on this subject. Shall science-fiction be unrestrained or must this field be choked by dogma, narrowness, and self-sufficient opinion?

Congratulations for a splendid improvement since I wrote you last, and many thanks for listening.—Robert W. Lowndes, 178th Company, CCC, Flagstaff, Maine.

Short And Sweet

Dear Editor:

I'm too busy to write, but I do want to commend you on the September issue. You're doing a fine job, and we're for you in a big way.

Keep up that EXCELLENT work.—Lewis F. Torrance, 1118 East Fifth Avenue, Winfield, Kansas.

Wanted——

Dear Editor:

I have read at different times all the contemporary science-fiction magazines and consider Astounding Stories the best yet.

The idea of printing our magazine semi-monthly looks good to me. It would, I believe, make long serials more interesting and perhaps longer serials could be printed. Also, I believe the idea of a large quarterly is a good one. Clipping the edges of the paper would, as can readily be seen, make a neater appearance and thereby augment newsstand sales.

The editor's idea of each old reader interesting a new one is good and if every one will get behind it, it will help to make a good magazine even better.

Replies to the letters by the editor and biographical sketches of the authors would also be improvements.—L. Wadsworth, 2737 W. 28th St., Denver, Colorado.

"Write Along"

Dear Editor:

I liked the serial, *The Legion Of Space*, immensely. I read Jack Williamson's first story, *The Metal Man*, in 1928. He has taken some strides since then, with about seven serials to his credit, and thirty shorter stories. He is one of the first science-fiction writers to put art into his stories. The word portraits of Giles Habibula are good. Ah, it'll be a mortal shame if we don't get more Jack Williamson.

The Skylark Of Valeron is coming write along. *Famine On Mars* was fine. Kelly is striding, but sometimes there is an element of artificiality to his story. Good picturization of future science, though. Your thought-variant was good, so good I will have to read it again to find what it's all about. Short stories were all great. *Time Haven*, by Howard W. Graham, Ph.D., is the best. Keep this author. That story was absolutely *literature!*

Well, you are improving the magazine every month. The only trouble is, if you drop below the standard of a previous issue, readers will claim you are beginning to deteriorate, even though the various stories are above the mark set by other magazines in the same line. However, there is one improvement you can make—that is, have more actual science in your stories. Makes the story seem less ethereal.

The small Type in Brass Tacks is good. The print in the rest of the magazine could be a little darker. The edges of the mag should be smooth—if you want to make an improvement that will earn the gratitude of every single reader, do that.—Paul Cahendon, 322 W. 4th St., Cincinnati, Ohio.

We Think The Idea A Good One

Dear Editor:

The real reason for my writing is inspired by one of Mr. Cahendon's suggestions in September's Astounding Stories. That is concerning the issuance of another sister magazine. Here are my ideas why such a magazine would fill a much needed place in the science-fiction world. At present all the science magazines are following your lead in trying to present stories with a new, unthought-of angle to them—as near thought-variants as possible. Also all stories have the scientific angle emphasized strongly now. This is, of course, O. K., but it seems to have been forgotten that there are other sides to science-fiction than that. I believe that all the readers who enjoy the basically scientific story also enjoy the basically adventure story with a scientific background subordinated to a setting, as on another world. In other words, stories such as Edgar Rice Burroughs, Otis Adelbert Kline, Ralph Milne Farley, Ray Cummings write. You continually notice readers asking for them and listing them among their favorite writers. Yet actually their stories would for the most part be entirely out of place in Astounding Stories. For they are not thought-variants or scientific to any great extent.

In brief, my idea is this: Print a monthly magazine of about the same general make-up as Top-Notch (with serials, however) that will endeavor to print adventure stories with the fantastic background. In a way the old Astounding (pre-S&S) did this. It emphasized just the type I have been talking about although not exclusively. That it was not a failure is certain. The new namesake is no more than that. It does not publish the same type at all. There is still a vacancy, therefore, for a new publication.

And while the old think tank is bubbling, here is another thing that just boiled over. Street & Smith is publishing several magazines of an order that might be called the modern dime novel. They are monthly publications each containing about a hundred-page novel each month about the adventures of one particular character in one general field. In other words, such magazines as Doc Savage, The Shadow, Pete Rice, Bill Barnes, etc. Now, how about another like these but about interplanetary fields? I think the fellows that form the bulk of the readers of this type would go for an interplanetary character. Certainly they do their best to gobble up the back numbers of science-fiction magazines when they can be had for about ten cents. You might call the character and the magazine The Planeteer. It would contain a novel a month about a space flyer known as that. I believe you could undoubtedly find an author who would be capable of turning out a story a month on those lines. And I'll bet that magazine would be a great success.

Enough for one letter. I could, I suppose, go on forever with new magazine ideas, but I must draw the line somewhere. But I honestly would like your opinion of this suggested magazine. Also the opinion of your readers. It would be interesting to see how many other readers will enthuse over the idea. Print this letter, and let's find out.—Donald A. Wollheim.

A Comparison

Dear Editor:

First I'd like to make a comparison of the two main science-fiction magazines. Magazine A is so far behind the main two that I won't bother with it. Astounding and Magazine B are far superior to A in every way. Here is the comparison according to my views:

Covers: B has and always has had the best covers of the science-fiction magazines. However, Astounding has had some very good ones. B's cover is the most attractive and also fits the magazine better than Astounding's.

Authors: Practically the same for both magazines, so that there is not much to choose from. B's best are Keller and J. B. Harris. Astounding's best are E. E. Smith and Fearn. So you are about even so far as authors are concerned.

Stories: Astounding usually has definitely superior stories and also more of them. The thought-variants are practically all superior to any story of equal length in B. The shorts are also as good or better than B's.

Serials: B is ahead here because they have only two or three parts to the serials no matter what the length is. Astounding's *Skylark* story will probably surpass any of B's serials, but so far she is definitely ahead both because of the quality of the stories and because they are not in so many installments.

Inside illustrations: About the same.

The readers' department: Astounding is ahead as to length, but B has a paragraph or so by the editor at the end of each letter which is a very good idea.

Price: Naturally Astounding is ahead here, for any one would prefer a smaller price if he gets the same quality and quantity of stories for twenty cents as he could for twenty-five cents.

Miscellaneous: B has several departments such as Science Questions and Answers, etc., as compared with Astounding's Editor's Page, but I would not advise you to have such departments installed as I prefer the space to be taken up with fiction. Not that I object to such departments, but I think one magazine is enough to answer all questions of interest to all.

So, taken all in all, Astounding is superior to all the other science-fiction magazines. And, which is much more surprising, is the fact that it has risen from last place to first place in less than a year. That proves the editors *have* to

be sincere in their plan to make Astounding the ideal science-fiction magazine.

The September issue is not as good as common, but I'm sure that the forthcoming October issue will be up to the high standard I have come to expect in Astounding Stories.

Here's hoping Strange Tales is revived.—Lionel Dilbeck, 1834 Gold Street, Wichita, Kansas.

Coming!

Dear Editor:

Apropos of the few but earnest brickbats on the subject of *Colossus,* I have already previously voiced my own enthusiastic approval of that story, and I call the attention of the critical to the fact that that one story declines to recede into the past and be forgotten, and months after its publication here we are all taking sides with an ardent partisanship on the matter. When a story declines to depart into the past and stay buried, as per the usual custom, in the readers' discussion, it certainly proves it was in some sort of way superior to the general run of even extra good ones, of which you have given us no dearth. But a cry for more is the sincerest and the most profitable flattery to reward an author for such arduous effort as Wandrei put into that much discussed story of his. And I hereby inquire for the second time—and more urgently than before—when do we get a sequel to his *Colossus,* and also to his *Farewell To Earth!*

I want to get the November, 1930, copy of the old Astounding Stories in good condition, as I stupidly gave away the first installment of a serial of which I have the rest on hand. For this I will exchange the November, 1932, copy of same magazine in perfect and clean condition. Will mail same to any one who advises me they have the one I myself desire.

I am minded to send in more comments on recent issues of the new Astounding at a later date. For the present, when do we hear more of Wandrei, and also I'll throw in an odd bouquet for *Sidewise In Time,* which was one of the best efforts and the most original I've read in ages. This isn't slighting some other authors, notably Frank K. Kelly, who is striking a new type of stories of his own, with heroes who are genuinely heroic—that is, willing to sacrifice themselves utterly for a high ideal. You have done very well to recognize his stories.

Succubus is the only perfectly awful story you have published so far; and *Colossus,* to my way of thinking, is the best one you have been guilty of. *Blinding Shadows* was also very, very good. I haven't ever run into a long Wandrei story that wasn't above the average, and I've read a lot of them. But I haven't seen a poor Frank Kelly one, either.—Miss Eva G. Brown, 620 S. Ft. Thomas Ave., Ft. Thomas, Kentucky.

We Would Miss Some Of The Finest Stories

Dear Editor:

I have just been introduced to Astounding Stories, and I wish that the acquaintance had begun earlier. The September issue contains the final installment of *The Legion Of Space,* which by itself is a gripping narrative. Its characters, actions and motives are all true to life as we know it at present, and in spite of the fanciful machines of the distant future, the story is made lifelike and real-seeming.

As H. G. Wells says, the reader will sportingly accept one cardinal assumption of the fantastic, but the action thereafter must be kept human and real. Touches of prosaic detail are imperative, and a rigorous adherence to the hypothesis. This story admirably conforms to these requirements.

Another method of making interesting narrative is exemplified in *Dragon's Teeth,* by Wallace West. Here the writer begins with a myth so well known as to be almost acceptable as fact, and translates his characters' actions and speeches into our current mode. This creates an astonishingly realistic air.

I would like to register one more vote, by the way, against serial stories. I don't like 'em.—Roland Vauxhaill Clemons, 241 Harwicke Road, Springfield, Del. Co., Pennsylvania.

The SPWSSTFM

Dear Readers:

Here is an announcement of great value: For a long time our fair magazines have been defiled, and now the SPWSSTFM has been organized to combat this evil.

Our society needs your help. If you are in sympathy with our great cause, drop us a post card, giving your full name and address.

The society (Society for the Prevention of Wire Staples in STF Magazines) is bound to wield power among publishers and editors with your help. Every one—readers, authors and printers—is invited to join this campaign. Our motto is: PULL THE WIRE STAPLES OUT OF STF MAGAZINES!

Drop us a card now!—Bob Tucker, P. O. Box 260, Bloomington, Illinois.

Wanted

Dear Editor:

I hate to pester you again, but I must. I'd like to hear from readers who have these stories on hand and wish to sell them. They are both by Coblentz. *The Blue Barbarians* and *After 12,000 Years.* Will accept correspondence from all readers.—Alexander Novak, 921 Hudson Street, Trenton, New Jersey.

There'll Never Be Reprints

Dear Editor:

Edward E. Smith's *Skylark Of Valeron* is progressing quite nicely. The second part is even better than the first.

And now, Mr. Editor, I have a few brickbats to fling. Please, if you must have reprints, do not get Verne or Poe. Let us have Cummings or Merritt.

Things I wish you would do in the future:

Secure Edgar Rice Burroughs and Dr. Keller for some of your stories.

Issue a quarterly with a book-length novel and three choice complete stories.

Make Astounding Stories a semi-monthly magazine.

And, lastly (after reading Harry Cowan's letter), how about giving us a short biographic sketch of the authors, along with a one-by-two inch picture? It would be only a column.—Preston Wells, Thomasville Avenue, Pocahontas, Arkansas.

For Sale

Dear Editor:

Thank you for *Skylark Of Valeron.* If any of your readers doubted your intentions of giving them the best, this story alone ought to convince them that Astounding Stories contains science-fiction of the first water.

They say, "With every rose you have to expect some thorns." So after praising your efforts, I am now going to offer a little constructive criticism. A good many of your stories have only a half-page illustration. How about a full-page illustration with each story? Espe-

cially now that you have such a fine artist as Dold.

I have noticed lately that there are quite a few requests for back numbers of Astounding Stories. I have the following numbers which I will sell: 1930—March, April, May, June, July, October, November and December. 1931—January, February, March and August. 1932—February, March, April, May, June, September and November. 1933—January and March.

Is it possible to get Mr. Gilmore to write some more stories about Hawk Carse?—E. O. Erickson, Marengo, Illinois.

And A Pleasure For Us!

Dear Editor:

I have just finished my eighth, the September issue of Astounding Stories. My introduction to science-fiction occurred, and fittingly so, with *Rebirth,* one of the most comprehensive studies in both mass and individual psychology it has ever been my pleasure to read. Rebuilding a smashed civilization from the very ashes of its destruction is a task calculated to make even the most headlong and imaginative fiction writer pause for consideration, and Mr. McClary's narrative reveals a great deal more than mere *consideration* on his part.

It seems I could ramble on forever, while a certain Kay Benton (undoubtedly one of nature's noblemen) bares all in one concise, I might add extremely concise, statement: "All I want to say is that *Rebirth* by Thomas C. McClary is the best story I've ever read." Exclamation point!

Mr. Editor, you deserve nothing but the highest praise for your earnest and fruitful endeavors to elevate Astounding Stories to a position of indisputable supremacy. That position has been evident these many months. Your most remarkable achievement, however, is the relationship of cooperation and understanding which has been established between editor and readers. I do not know ye ed. A reader states that you once had a higher position than your present one. Whoever you are, I feel that at the rate you are now traveling it won't be long until you will be quite unregretful of the change. Quite the contrary, in fact! You have the readers behind you, which is a big thing in any man's magazine game. May I offer one suggestion? Wouldn't it be possible, Mr. Editor, for you to write just a line or two after each letter in Brass Tacks, even if only a few cutting remarks to silence some habitual letter-box calamity howler, or answer a reader's question? This is one improvement I have been patiently waiting the appearance of in Astounding. Can I hope to see it soon?

The September issue in my opinion is the best since February, and excluding *Rebirth,* the best yet.

With this, Mr. Editor, I conclude my letter, which has stretched away to greater lengths than I had intended. Throughout I have felt, as you suggest, that I am writing to you personally. I have tried to offer my bit of encouragement, although (happily to say) you seem to have all you can use, and some to spare. If I have succeeded in making you feel any better, all I can say is: "It has been a pleasure!"

If any reader feels the urge, I shall be pleased to answer any correspondence received. Bargain?—Roy A. Sanders, 653 Isabella Street, Oakmont, Pennsylvania.

Sequel? Just Wait!

Dear Editor:

This is my first letter—ahem—note to you, though I have indulged in Astounding Stories for years. My great kick is coming, the first kick I have ever had to mail you, and I hope the last.

Why that heading on Dr. E. C. Scott's letter in the August issue? "A Final Word On *Colossus.*" The idea! Why, it's horrible, the utmost in cruelty to your readers. A wonderful story like that without a sequel. Preposterous, absolutely! Why, it's not done in the best of circles, y'know.

Please think of your poor readers in suspense, and be especially nice to Mr. Wandrei and coax him to relieve our agony with a nice long sequel.

Astounding, in my estimation, is the finest and most scientific science-fiction magazine printed. Very glad to see my friends of the *Skylark* back in print again.

And if some one wants to drop a line to a Scotsman, I'll promise on my honor to put a stamp on my reply.—Charles W. M'Lagan, Pasadena Drive, Aspinwall, Pennsylvania.

Offered

Dear Editor:

I have in my possession a large number of back editions of Astounding Stories, together with those of the other science-fiction magazines on the market, and am offering them for sale.—J. Dee, 64 Woodland Street, Mount Kisco, New York.

See Magazines For Sale In These Pages

Dear Editor:

Man, oh, man! Have you got a magazine, or have you got a magazine? The answer is you bet you have. It's gigantic, colossal, tremendous, and other words to that effect. It's even a million light years ahead of its nearest rival.

If any reader has any Astoundings between September 1933 and March 1934, I would like to hear from him if he wishes to sell.

It seems that Dold is the general favorite among the artists. Personally, I think he is the worst in the magazine. I prefer M. Marchioni any day. However, I have no kick coming.

In closing let me ask you to keep out all reprints. I feel sure that we want new stories instead of old ones.—James W. Perrin, Jr., 1615 Market Street, Wilmington, North Carolina.

"The Ten Best"

Dear Editor:

As I finish reading this great September issue, it dawns upon me that the new Astounding is exactly one year old.

What an improvement since last October! In cover design, in quality of story, and in the magazine itself, improvement is written on every page. The stories have become better steadily, from the short ones in the old October issue, through the gradually improving ones in the succeeding issues, until now we have the crowning achievement, the most glorious figure in all science-fiction, the *Skylark.*

In my own humble way, I have tried to pick what I think were the best stories of the year. Of course *Lo!* and *The Skylark Of Valeron* are in a class by themselves; but in regard to the other stories, here are my ten best: 1. *The Legion Of Space.* 2. *Colossus.* 3. *Rebirth.* 4. *A Matter Of Size.* 5. *The Emperor's Heart.* 6. *Redmask of the Outlands.* 7. *Man Who Stopped The Dust.* 8. *Sidewise In Time.* 9. *Famine On Mars.* 10. *Spoor of the Bat.*

I would like to see more stories by Gilmore.

Some time back I received a magazine and a letter which proved very helpful to me from

a science-fiction fan in Ludington, Michigan, who did not sign his name. I wish to take this means of thanking him.

I will be glad to receive letters from other readers and promise prompt answers.—E. A. Rinderle, 2415 St. Ann Street, New Orleans, Louisiana.

Wham

Dear Editor:

I have been sitting quietly by and watching the progress of Astounding Stories. When it first came out under the Street & Smith banner I had great hopes for its future progress, but it has failed to come up to all that you have promised. Science-fiction has reached its lowest ebb this year, and only *Legion Of Space* saves Astounding Stories from joining its rivals in mediocrity. *Skylark Of Space* has fallen far below the previous E. E. Smith par, and frankly, I was terribly disappointed in its first two installments. Perhaps the last installments will bring Astounding out of the mire.

As a constant reader of Brass Tacks, I notice that there are very few letters complaining of the trash fed us (by which I refer to the numerous silly short stories you cram down our throats). I do not know whether it is because your readers are too spineless to speak up, or whether you simply don't publish those letters. Don't make the magazine into a semi-monthly, for now the quality of the stories is bad enough; if it were a semi-monthly, I am sure it would descend to equality with other science-fiction magazines.

Another thing that causes my criticism of the magazine is *Lo!* This article is the worst written and the most utterly senseless that it has ever been my misfortune to run up against. There is no point to the series, it is merely a catalogue of strange occurrences, most of which probably never occurred at all.

I do not deny that Astounding is better than its two principal rivals. If only *Lo!* could be cut out and the quality of your short stories brought up to a par with Williamson's *Legion Of Space*, Astounding Stories would then truly be a shining light and worth the time it takes to read it through (which is more than I can say at present). I have no criticism of the make-up of the magazine, not that it couldn't be improved, but I am interested in the reading material the magazine offers, not the artistic.

The International Cosmos Science Club is still open for membership and any one interested in joining should get in touch with John B. Michel, 3214 Beverly Road, Brooklyn, New York, the chairman of the membership committee.—Edward C. Love, 320 North Jackson Street, Quincy, Florida.

Back Issues Wanted—An Apology

Dear Editor:

I'm what you would call a comeback. I started, a few years ago, to read your magazine, and stuck with it until it crumpled up into the fourth dimension, or some equally "gone" place. When it made its comeback, I avoided it for one reason, a reason I found later to be wrong, and that was because Astounding was a Street & Smith publication. I always, until lately, associated Street & Smith with cheap detective or Western novels. But I wish to apologize, since you have accomplished a lot with Astounding. I don't mean you're perfect, not by any means, rough edges, for instance, but you are approaching the high level that your oldest rival set, back in 1926-1928.

I notice most of the readers want to make a semi-monthly out of Astounding. Don't do it! If you did, and kept the same price, most of us would have to miss every other issue. And if you reduce the price, the prestige of your magazine would drop too.

What you should do, and I'll bet a lot of readers agree with me, is to issue a quarterly.

The Living Equation was excellent. It's the kind of story that reminds me of the peak years of science-fiction.

Because it took me five months to convince myself that Astounding Stories was really worth its price, I would like to get hold of the February, March, April, May and June issues for 1934. Are there any for sale?—Arch T. Kinzel, 708 Sunnyside Avenue, Akron, Ohio.

An Itch

Dear Editor:

I have just purchased the most recent issue of your publication, and so have not had time to read *Skylark Of Valeron*, but I know what it will be like. You are to be congratulated highly on securing it. The other *Skylark* stories, *Spacehounds*, and *Triplanetary*, stand out as the best interplanetary stories I have read, and I have read an unusually large number of such stories, both old and new.

I have every copy of Astounding Stories, but the last, under the old banner. I was ready to quit then, but now the magazine is so far above competitors that it is the only one I buy regularly. I have an itch to write a thought-variant, so I may be sending it along one of these days.

As to illustrations, Brown's interior scenes are the worst. He's not bad on covers, but keep him outside the magazine. Dold is fair, but don't give him all the illustrations. What is wrong with Marchioni? I consider him an excellent artist. I, too, should like to see Wesso's work again.—Donald Allgeier, Citizen's Military Training Camp, Recreation Tent, Fort Leavenworth, Kansas.

We Leave It To You, Readers!

Dear Editor:

The September issue is the best yet. The magazine has improved month by month since you first put it back on the newsstands. All I want to know is how long this Utopian state of affairs is going to last!

There were two motions made in this month's Brass Tacks, which I wish to heartily second. The first one concerns getting out a quarterly. This is something the old Astounding never had, and always needed. At first try printing a limited number to be put on trial and to see how they'd sell. I guarantee they'd be snapped up by rabid science-fiction fans before you could say "Giles Habibula." The second suggestion I'm out campaigning for is to bring back Astounding's sister magazine—good old Strange Tales. It used to be far and away the best weird-fiction magazine on the market until it was discontinued at the height of its career.

The new and bigger Brass Tacks department is a genuine improvement—the most interesting part of the magazine. Leave it to the readers to keep the ball rolling.—Robert Tufts, 61 Rathbun Avenue, White Plains, New York.

Spreading The Gospel!

Dear Editor:

Accept my most colossal congrats on the September number. It is a wow! I have a feeling that the other magazines printing science-fiction haven't got a ghost of a chance.

All that remains to be done now is go semi-monthly and cut the edges of the pages smooth.

I would like to tell you of a curious incident that occurred when I was purchasing my copy. A fellow and I got talking at the newsstand about Astounding. He has been reading it since

its inception. I spread the gospel to him, asking him to tell others about it, and so increase the circulation. He caught the idea so violently that he rushed in and purchased five copies to give away! Maybe that isn't backing your cause!

Well, I'll be suing ya.—Fred Anger, 2700 Webster Street, Berkeley, California.

Announcement

Dear Editor:

I would be obliged if you would publish this letter in your Brass Tacks columns for the information of your readers who may be interested.

I wish to inform you of the formation of the British Interplanetary Society at the address given. The society is run on similar lines to the American, French and German societies. Its objects, to quote from the constitution, are "the stimulation of public interest in the possibilities of interplanetary travel and the dissemination of knowledge concerning the problems which at present hinder the achievement of interplanetary travel. This involves the establishment of a central headquarters of the society which will include a fully equipped laboratory for the use of those members engaged in active research."

Three classes of membership are open to individuals—fellowship, membership, and associate membership. Associate membership is primarily for those under twenty-one years of age.

All members will receive free copies of the journal of the society which contains news and articles on the different aspects of interplanetary travel.

The membership of the society includes such famous names as Professor A. M. Low, D.Sc., Herr Willy Ley, M. Robert Esnault-Pelterie, Herr Ing. Gido Pirquet, Dr. Jakow I. Perimann, while the members are of almost every nationality in the world.

The society is also in close coöperation with the American Rocket (Interplanetary) Society.

Those interested can obtain any further information by writing to the secretary.—Leslie J. Johnson, Hon. Secretary, British Interplanetary Society, 46 Mill Lane, Old Swan, Liverpool 13, England.

And Another

Dear Editor:

Astounding Stories, the peer of them all, has scored again! This time it's the September issue. What a cover! Some readers may brag about the so-called "artist" Paul, some can brag of Wesso, but Brown beats them all! Have more such colorful covers!

I always read Brass Tacks and the editor's page first. I think they are swell.

Before I close I wish to announce to the boy readers of your mag that the "Stf. Association for Boys" is doing fine. Any one wishing to join write to Henry A. Ackermann, 5200 Maple Avenue, "Pimlico," Baltimore, Maryland.

Suggestions

Dear Editor:

Here are a few suggestions that I believe will help the already pace-setting record that Astounding Stories is making.

1. Get rid of overlapping covers and use a stiffer grade of paper.
2. Issue a quarterly and publish Astounding Stories twice a month.
3. Keep Brown but use Dold, Wesso, Marchioni or some other cover artist once in a while.
4. Have a column telling what stories are to appear each month.
5. Try to have Dold make his drawings a little bit clearer.
6. Have an introduction before each story to give us an idea of what we are to read about.—James N. Mooney, 416 West 118th Street, New York, N. Y.

"Please!"

Dear Editor:

The Skylark Of Valeron is superb and as for the covers, they are very good. Keep Brown for better or for worse.

Will some one please write to me, as this neighborhood is as dead as a dog shot with a sub-ionic ultravibrocosmic intrometric dematerializer (or somethin'). I will answer all letters as soon as possible.—J. F. Rawlings, 6521 First Street, Takoma Park, Washington, D. C.

Available

Dear Editor:

I find many inquiries in Brass Tacks for back issues of the old Astounding Stories. I have almost a complete set from Volume 1, Number 1 available.

I'd like to compliment you, as I find the new Astounding Stories is a great lot better than the former one. This is the first time I have written you, but you can see by above list of old books that I am an old reader.—Frank Overstreet, 1612—7th Avenue, Charleston, West Virginia.

Weird Wanted

Dear Editor:

Since I have been perusing your excellent publication for many years, I feel it my privilege and duty to give you the low down on all my opinions, pro and con.

When the old Astounding under Clayton Publications went under, it left me sorrowing, to be sure, but the new has made up a thousand times for the old.

Since you are giving us more and better science-fiction for the money, I feel sure your cause is going to be triumphant.

Howard V. Brown is good on the covers, but Elliot Dold and Marchioni are by far the best interior decorators. Speaking of covers, the cover for *The Skylark Of Valeron* is the best that you have had.

Considering the "weird" situation, I think that a slight bit of the bizarre and unusual never harmed any one. It at least adds to the merits of the stories. Please don't put the taboo on a little weird stuff commingled with the other.—Fred Anger, 2700 Webster Street, Berkeley, California.

Wanted

Dear Editor:

Do you happen to know where I could get the two previous *Skylark* stories? They were published before I became interested in science-fiction, and now I wish to read them.—Earle S. Troupe, 717 Fifteenth Avenue S. E., Minneapolis, Minnesota.

A Two-day Reader!

Dear Editor:

I have been reading your magazine ever since it came out last September. I liked it better than the other two from the beginning. It seems to be endowed with some vital spirit while the others are sort of dead.

Why don't you make Astounding Stories a

semi-monthly? I finish it two days after I get it and then fidget around for twenty-eight days waiting for next month's issue to come.

You will have to excuse my writing because I have one paralyzed arm. I got infantile paralysis about three months ago and one arm is still paralyzed.—Stanford Burberick, 1520 Floribunda Avenue, Burlingame, California.

We Think They Will Be

Dear Editor:

Here are my comments on the September number:

The Living Equation outstrips the other stories by at least six lengths. Mr. Schachner always writes good stories. I didn't care so much for *Famine On Mars* and *The Wand Of Creation.*

Why not answer the questions in Brass Tacks? That is, those which are of interest to every one. What do the other readers think about it?

So the *Legion Of Space* ends at last. Well, I hope the serials to come are as good or better. *The Skylark Of Valeron* seems to say that they will be.—James F. Davis, Bellevue Hospital, New York, N. Y.

Five Thanks

Dear Editor:

Just a few words to thank you for

1. Enlarging the size of Astounding Stories.
2. Reducing type of stories to give us more stories to read each month.
3. Enlarging space and reducing type of Brass Tacks.
4. Giving us a *Skylark* story.
5. Having Elliot Dold do the illustrating, although his work in the September issue was too "hurried through" and not so good as the previous two issues.

You have the best authors of science-fiction in Williamson, Smith, Vincent, Coblentz, Wandrei and Leinster.

Hoping for smoother edges, a quarterly and continued success.—John Lemberakis, 154 North Willow Street, Trenton, N. J.

"A Well-aimed Kick"

Dear Editor:

Heartiest congratulations on the steady improvement of Astounding Stories. I subscribe to all the science-fiction magazines but I think that Astounding Stories tops the list. Many of your stories contain that elusive "something different" which we all look for and only find in perhaps one story of every issue of the other publications. You are certainly succeeding in getting the authors. Vincent, Schachner, Diffin, Wandrei, Williamson, Coblentz, Leinster—these are names to excite any science fan. But, please, not too much of Coblentz. The reactions of his human beings of the present day always make me want to plant a well-aimed kick on the posterier part of their anatomy to wake them up. Mr. Coblentz exaggerates just a little too much. Stick to Leinster. I have never yet read an uninteresting story by this author. He has the knack of holding the attention from start to finish.—W. A. Gibson, Rowanbank, Bathgate, West Lothian, Scotland.

A Bouquet For Jack

Dear Editor:

You ballyhooed Edward E. Smith's new novel, *The Skylark Of Valeron,* for two months, yet I believe it can rank only third in the August Astounding. So powerful were two of the other science-fiction stories that they surpassed the first part of Dr. Smith's great epic. They were *The Legion Of Space,* Part V, by Jack Williamson and *Stratosphere Towers,* Nat Schachner's smashing short novel.

Understand me, I'm not discrediting Dr. Smith's great story. It's a stupendous piece of science-fiction but the other two are superstupendous. In my humble opinion (I can fairly hear the gasps of astonishment, or rage, and of awe from old science-fiction readers), Jack Williamson is a greater writer than Edward E. Smith. I'm looking forward to more of Mr. Williamson's stories.—Dan E. Anderson, East New Market, Maryland.

"Two Faults"

Dear Editor:

This is the first occasion upon which I have written to your magazine. I should have done so before, but until recently I have been unable to obtain current numbers, and past ones only irregularly.

To my way of thinking, Astounding Stories is the best science-fiction magazine published, and I sincerely hope it does not fall below its present standard.

There are two main faults. Is it not possible to have Wesso as chief artist? Secondly, I would like the pages to be trimmed more neatly. —A. H. Sherwood Campbell, 38 York Road, Wolsing, Surrey, England.

Loyal

Dear Editor:

Congratulations on turning out such a splendid magazine. I have read many different kinds of magazines running from Western, war, aerial, adventure, detective, et cetera, to practically every kind printed. These I have bought just for the mere purpose of passing away time. Last June, I bought that month's issue of your magazine and from then on vowed to be a loyal reader of Astounding Stories,

As to your writers, Wandrei rates as one of the best, even though his stories in some parts are utterly absurd.

Fearn writes good stories but his scientific knowledge seems to be lacking in some of them. The other writers on your staff are very good.

Serials are entirely out of my line, they keep you in too much suspense. If you must have them, keep them short, not prolonged for six parts as *The Legion Of Space* by Williamson.

As for drawings or cover paintings, suit yourself—it's the story that counts.

After Charles Fort's *Lo!* is finished, have another article or story of his works in your magazine.

Correspondence welcomed by readers.—Henry Heikkila, Box 78, Centerville, Massachusetts.

1851—Can Any One Beat It?

Dear Editor:

Hold Dold! Hog-tie him if necessary! Raise his salary if necessary! Raise it anyway. But be sure that he continues to illustrate for Astounding. And let him do at least one cover, for he's supreme there, too. Ever since I first saw his work, I've contended that Dold is easily the peer of all science-fiction artists.

The old Astounding Stories (January, 1930, to March, 1933) was, frankly, the worst magazine on the market. I was glad when it ceased publication. And when I saw it on the stands again under the S & S label I snubbed it—let No. 1, No. 2, No. 3 and No. 4 get by me without trying them. It was not until a friend waxed enthusiastic over the "thought-variants" and *Short-Wave Castle* in particular, that I decided to look into the matter. I read the above-mentioned story and *Rebirth*—and immediately

bought the four back issues I had missed. Needless to say I've missed none since.

The thought-variants have all been very good with the exception of *Born Of The Sun* and *The Brain Of Light*. But I have found that some of the others are truly "thought-variant" although not labeled so. And that is all right, too.

Mr. Leon Pois' letter in the August issue so interested me that I spent an entire day counting my science-fiction magazines just to see how many I did have. The result was not only surprising, but almost unbelievable to me. I have a total of 1851.

I do not claim to be the world's foremost reader of science and fantasy fiction—for I am not; but I do hereby claim to be the foremost collector of this type of literature, and will defend this honor against all comers.

And of all the magazines, I can truthfully say that the only one I read from cover to cover is Astounding Stories. The others do well to average one worthwhile story per month. I buy them for that one story each issue (as an average). But I can never be *sure*. Whereas with Astounding I am safe.—Henry Hasse, 1236 Wade Street, Indianapolis, Indiana.

Strange!

Dear Editor:

It seems so strange I almost don't believe it myself.

Ordinarily I don't buy magazines, but I did purchase the issue of Astounding Stories containing the conclusion of *The Legion Of Space*.

My brother bought all the previous issues and, of course, we both read them. He went on his vacation before the last edition of the "most popular" scientific magazine and for that reason I had to buy it, which, needless to say, we both enjoy.

In my opinion, if you care to regard it, the best story is *The Legion Of Space* by Jack Williamson.

I am in favor of a quarterly issue besides the regular monthly editions. In that quarterly should be all complete stories including some serials.—Cyril J. Schultz, Buffalo, New York.

An Ally For Fort

Dear Editor:

I am an old science-fiction hound, having received my introduction to the art with the first *Skylark* story. I appreciate any and all stories with a basis of even pseudo-science, so there will be no criticism of any of the stories you have published.

But—*Lo!* didn't make me think (impossible)—it stirred me to action. Charles Fort records some of the inaccuracies of the astronomers. He refers to the Michelson-Morley experiment, but neither he nor any one else seems to see the primary fault with the apparatus used in that experiment.

The idea was to measure the speed of light in two directions, find the difference, if any, and calculate from that the "ether drift." The result was nil. Why? Einstein "explains" it with his "mathematics" but says nothing.

The method was to reflect light from one of several mirrors mounted on a wheel to a mountain top several thousand feet, about three-quarters of a mile (if I remember right) away where another mirror was mounted. This second mirror reflected the light back to the wheel, and from there to the eye of the observer. If the wheel rotated fast enough, the light left one mirror and returned to the next one. Then the professors could calculate the speed of light from the recorded speed of the wheel.

All very well to measure the speed of light with, but how in this galaxy can they measure ether drift with it, if the light was to travel there and back (wheel to mirror to wheel) before its speed is measured? Any difference of speed would cancel. Did any one think of that? Apparently not, or why would Einstein have bothered to invent his "new" system of mathematics to explain nothing with?

I agree with Charles Fort: something is wrong with the science of astronomy as it is now being mistreated. Apparently the only way to find out the truth is to go there and find out. —Willis Rexford, Girard, Pennsylvania.

The Excellent Material Submitted Is Increasing Steadily, However

Dear Editor:

Many of your readers are clamoring for a semi-monthly, but I am against this, although I would greatly enjoy reading your magazine (or should I say our) more often. The reason for my view is as follows: You would have to get the same amount of material (stories, et cetera) in half as much time. There would be less time in which to select your stories and, since you have no staff writers, you would have to select from material which you would have discarded had the magazine remained a monthly. In this way your magazine would greatly deteriorate.

But one thing is certain, you do need a quarterly edition. In this quarterly you could feature a long novel and a few short stories. You might charge twice as much, but you could have about 280 pages. (How's that?)—Hyman Tiger, 587 Dumont Avenue, Brooklyn, New York.

"Clearing The Field"

Dear Editor:

Many thanks for the smashing August number, and indeed for all the other fine numbers previous to it. There is now no doubt at all that the best science-fiction magazine on the market is Astounding Stories; in fact, it has gone so far ahead that the others must feel a bit dazed. At the moment, you seem to be all out for the leadership in the science-fiction field, and so far you have by your determined efforts outstripped your rivals. What about giving them a chance?

Amongst the many remarkable improvements which have been instituted in Astounding Stories with its revival, I have noticed: (1) New stories and ideas generally. (2) Great cover artist, Howard V. Brown. (3) Elliott ("What an artist") Dold. (4) Distinctly personal and friendly tone of the editorials, and (5) quality and quantity of Astounding description. Just keep going at your present rate and you'll clear the field altogether.—Fitz-Gerald Grattan, "Beech Hill," Newcourt Road, Bray, County Wicklow, Irish Free State.

Correspondents Wanted

Dear Editor:

I wish to correspond with you readers on any subject, especially science. Please write to me promptly, and I will tell you of the many experiments that I conducted. I will answer all letters.

I also have many various science and history books for sale.—LeRoy Christian Bashore, 310 North 7th Street, Lebanon, Pennsylvania.

Requests

Dear Editor:

The September issue was excellent. A few requests; summed up, they are—smooth edges, more durable covers, fewer and longer stories

in place of the present short mediocre ones, less issues per serial, a quarterly, and above all, Burroughs as one of your authors. How about it?—A. C. Garretson, Redmon Park, Syracuse, Indiana.

Dr. Smith—An Admirer Would Like To Hear From You!

Dear Editor:

Having read *The Skylark Of Space*, and *Skylark Three*, several years ago, I was pleasantly surprised to see your announcement of *The Skylark Of Valeron* on the cover of your August issue. Needless to say, I bought the magazine. I have just finished the second installment and it seems as though Dr. Smith will surpass himself in his present story.

I have always regretted not having saved the issues in which his previous stories appeared; it seems a shame that material of such quality is not in book form.

Can't we have a short biography of Dr. Smith?—Geo. S. Jergens, 338 South Hardesty, Kansas City, Missouri.

Letter-writers Wanted

Dear Editor:

Have been reading Astounding Stories for a period of four years, but never has it been at the level it has now attained. Your last three issues are masterpieces. This is my first letter to any magazine, but I was so enthused by your September issue, that I just had to comment on the stories. Here are a couple of suggestions:

Keep thought-variants. Give us some more good time-travel stories like *Sidewise In Time* by Murray Leinster. Give Brown the covers to illustrate, and keep Dold and Marchioni working on the interior. Incidentally, Dold's second illustration for *The Skylark Of Valeron* was the best in the September issue, although Marchioni's for *Famine On Mars* gave him some nice competition.

I would like to exchange comments on science-fiction if aybody cares to write.—Burton Siglin, 416 North Rock Street, Shamokin, Pennsylvania.

A Much-appreciated Compliment

Dear Editor:

Although I have been reading science-fiction since its inception in 1926, this is the first time I have ever written to an editor. Reason? Astounding Stories' rise to the top.

Mr. Editor, I'm convinced that Astounding right now is better than the first magazine of science-fiction in the years 1926, 1927, 1928 ever was. A sweeping statement, yes, but I've thought long and hard before making it, and from the bottom of my heart I sincerely believe it. I expect some old-timers will call me crazy, but I looked before I leaped.

When, oh when, are we getting our quarterly and semi-monthly? Tell us, won't you? Whatever you say we'll believe you, because we readers know that our editor never heard of false promises.—Clarence Wilhelm, 12328 Arlington Avenue, Suite 8, Cleveland, Ohio.

An Embattled Reader

Dear Editor:

As I stand by the airlock of my gigantic spaceship, I think of the hideous Godarrnes to whom I am risking my life. But it is the third Wednesday of the month and I must get my copy of Astounding Stories.

Ah! I see the floating news stand looming up through the utter blackness of space. Getting the controls, I float out of the airlock. Horrors! There are long gleaming shapes weaving around me! Pulling out my atomic disintegrator—Bz-z-z-z! I am free of the Godarrnes. Propelling myself to the airlock of the news stand, I open it and what do you think I see? My September Astounding Stories!

Ha! Ha! Scare you? But I would go through fire and water for Astounding Stories. Where, oh where is the quarterly and Strange Tales? The greatest science-fiction story ever written is *Rebirth*.—Marvin Wolf, 3829 West Roosevelt Road, Chicago, Illinois.

Request

Dear Editor:

Congratulations! Your magazine this month is great. It is the best science-fiction magazine that I read out of the four.

I like your covers very much. This month's cover was not bad at all. In fact, I think it was darn good. I would also like to have somebody write to me. I am 16.—George G. Wyche, 804 East First Street, Alice, Texas.

Parliament To The Rescue

Dear Editor:

What a top-liner Astounding Stories is. I've just been reading your readers' comments in the March issue, and I must confess I often wish our own editors were as live as you fellows are over there. Throw a brickbat at some of our editors and they would try to get Parliament to pass an act to stop it.

Bah! They make me tired. I grab all the Street & Smith publications I can get hold of and then want more. It makes me squirm to read my fellow fans' comments on this or that exceptional story and not be able to get hold of it straight away.

See here, editor, I'm going to record right now that your publications are enough to make a fellow emigrate to the old United States. Let's have more stories like *Born Of The Sun* and *The Legion Of Space*, and please can't you make Brass Tacks bigger and reply to your readers' letters?

Well, now that I've handed you a grand slam, of course you deserve it, will you do me a favor? I want you to put this in Brass Tacks so that I can make contact with a lot of new pen pals. I'd like to hear from anybody, any age, any sex, Martians as well, if you've got any wandering round. I promise to reply to every letter. Do a chap a good turn, editor.

Here's wishing you and your magazines, especially Astounding Stories, all the very best and a long life.—Charles F. Noad, 36 Gibson Gardens, London, N. 16, England.

For Sale

Dear Editor:

I have read with interest the new A. S. When I first saw it under new management I expected an inferior publication. Yet I am forced to admit that it holds a place far above all other magazines in the field for the first time in its existence. It abounds in novel ideas and virile principles. I have only one complaint: the thought-variants are not always original.

I hope you publish this letter as I would like to sell my collection of magazines up until the new management. I have the complete set and would like to sell it in one lump. There are thirty-four issues in all which I will sell for $4.50 plus postage.—Dan Volper, 111 East 97th Street, Cleveland, Ohio.

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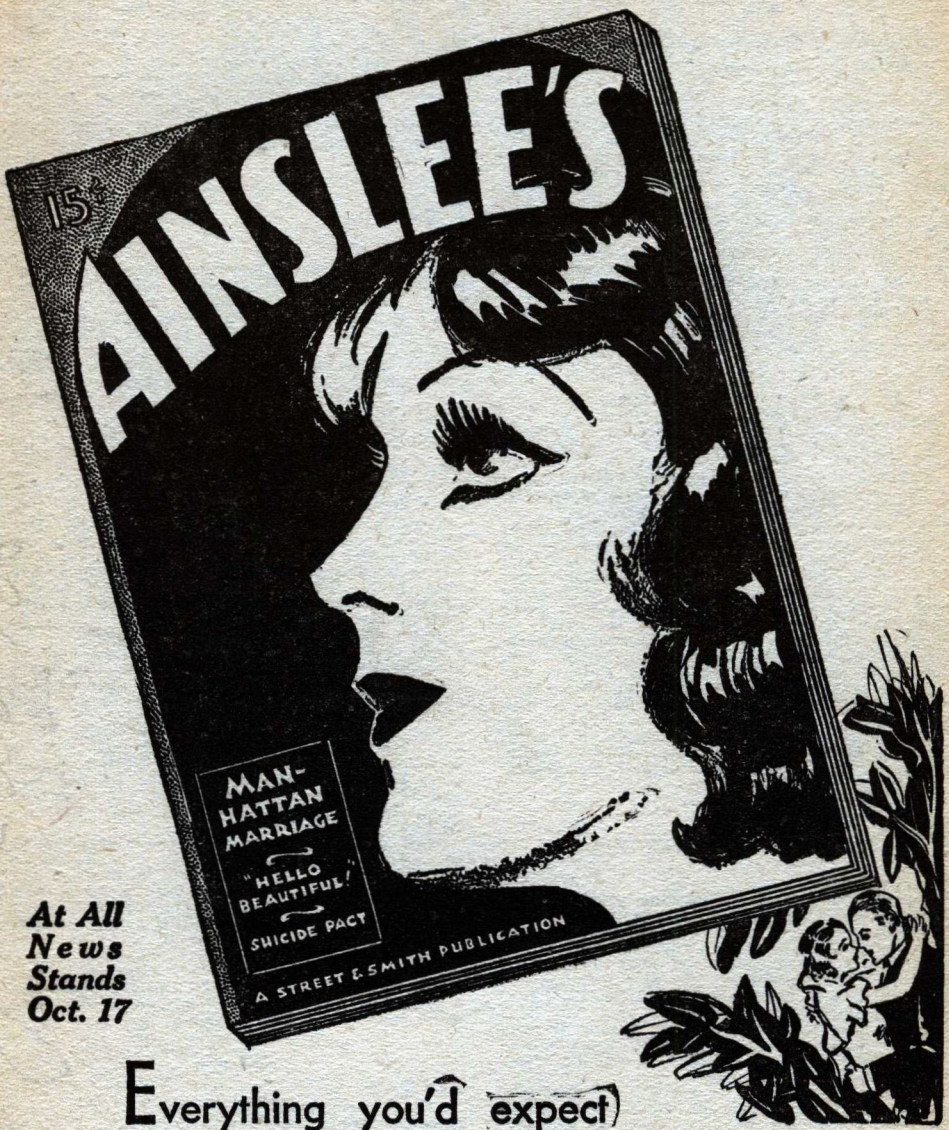

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AST—10

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