

ASTOUNDING

FEB. 1939

20¢

SCIENCE-FICTION

A STREET & SMITH PUBLICATION

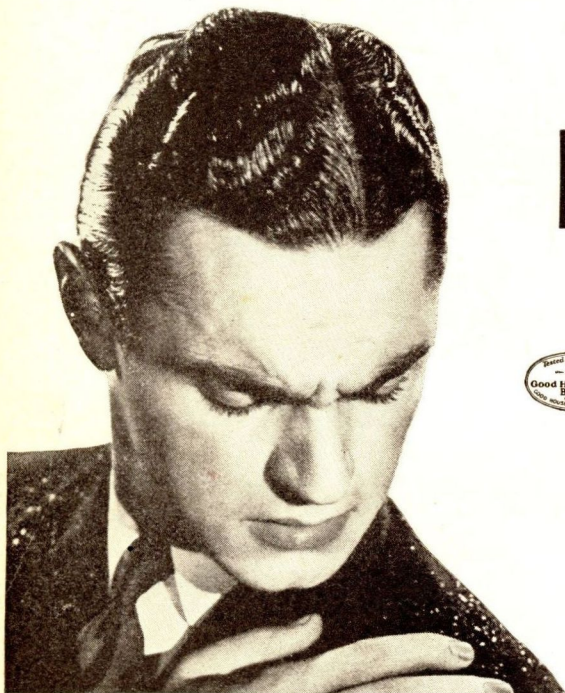


Robert
1939

CRUCIBLE OF POWER

By Jack Williamson

Get rid of that telltale **DANDRUFF** for keeps—with **LISTERINE**



Pityrosporum ovale, the germ that causes dandruff, magnified many times.

Sensational discovery that a germ causes dandruff leads to antiseptic therapy. Listerine Antiseptic relieves and masters dandruff, tests prove. 76% of patients of New Jersey clinic got amazing relief.

THINK of it, dandruff that defied science so long now yields to a new delightful treatment.

Its cause has been discovered—a queer bottle-shaped germ called *Pityrosporum ovale*, which is found in the scalp, the hair follicles and the hair itself.

Quickly killed

Listerine Antiseptic, famous for more than 25 years as a germicidal mouth wash and gargle, kills these germs when applied full strength with massage.

Thus freed of the parasite that saps their vitality, scalp, hair follicles, and hair itself come back to normal in a surprisingly short time. Itching stops, and the scalp and hair regain new vigor and lustre.

The Listerine Antiseptic treatment takes the place of those smelly salves, lotions, pomades, and dressings that treat dandruff symptoms but not its cause.

Easy . . . delightful . . . quick

If you have any evidence of dandruff, all you do is douse full-strength Listerine Antiseptic on the scalp once or twice a day. Follow it with vigorous and persistent massage. It's the most delightful, stimulating treatment you ever heard of and gets results that simply amaze you.

Every day we receive enthusiastic letters telling how Listerine Antiseptic checked dandruff in a much shorter time than that shown in exhaustive clinical and laboratory tests.* Even after dandruff disappears, it is wise to use Listerine Antiseptic at regular intervals to guard against reinfection.

Don't wait until dandruff becomes an advanced infection; if you have the slightest symptom, start the Listerine Antiseptic treatment now . . . The only treatment we know of which is backed by authoritative scientific proof. Such prompt treatment may spare you a lot of trouble later.

LAMBERT PHARMACAL Co., St. Louis, Mo.

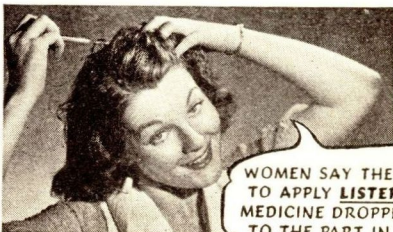
DO OTHERS OFFER SUCH PROOF?

*Clinic and laboratory prove this:

1 That dandruff infected rabbits treated with Listerine Antiseptic showed a complete disappearance of dandruff symptoms at the end of 14 days on the average.

2 A substantial number of men and women dandruff patients of a great mid-western skin clinic, who were instructed to massage the scalp once a day with Listerine Antiseptic, obtained marked relief in the first 2 weeks, on the average.

3 Seventy-six per cent of the dandruff patients of a New Jersey clinic showed either complete disappearance of, or marked improvement in, the symptoms of dandruff at the end of 4 weeks.



WOMEN SAY THE BEST WAY TO APPLY LISTERINE IS BY MEDICINE DROPPER APPLIED TO THE PART IN THE HAIR.



"SELDOM SEE AN I. C. S. GRADUATE OUT OF A JOB"

"IN ALL THE YEARS I have known of the International Correspondence Schools, I have seldom seen one of your graduates jobless."

A business executive made this statement in a recent letter commenting on the I. C. S. graduates and students in his employ and expressing regrets that it was necessary to reduce his personnel.

"However," he added, "all I. C. S. graduates and students will be retained, for I

fully realize their value in my business."

The reason so many I. C. S. men have jobs is because they are *trained men!* A recent investigation into the working conditions of 1000 I. C. S. students revealed only ten unemployed. You, too, can be an I. C. S. man.

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IF I FAILED...WE WERE ALL DEAD MEN



LASHED TO SHROUDS
OF SINKING,
BURNING SCHOONER,
SAILORS SEE HOPE
OF RESCUE FADE

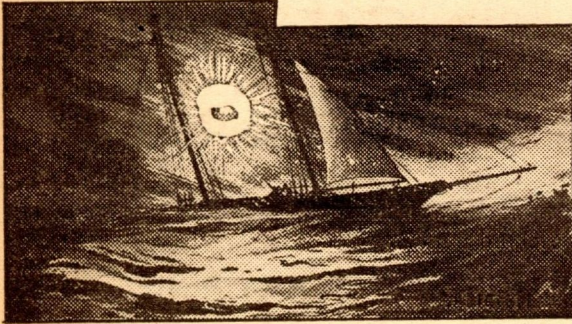
① "The dream of my life, for which I had saved since I first went to sea at twelve, had come true!" writes Capt. Hans Milton of 610 West 111th St., New York City. "I was making my first voyage as master and owner of my own vessel, the two-masted topsail schooner 'Pioneer,' when the hurricane of last September caught us 400 miles off Nantucket.



② "We were pumping to keep afloat when we passed into the windless vortex of the storm where the waves were leaping and jumping crazily and where they crashed in our companion ways and filled the ship beyond hope of saving her.

The five of us and the cat scrambled aloft for our lives. Our deck-load of lumber kept us afloat and without fresh water and with almost no food we lived, lashed to the rigging, for three endless days and nights.

③ "Once a steamer hove in sight—but failing to see our distress signals, went her way. At 3 a.m. on the fourth morning steamer lights showed momentarily over the wild sea. We rigged a huge ball of sails and blankets, soaked it with gasoline, touched it off and hoisted it aloft.



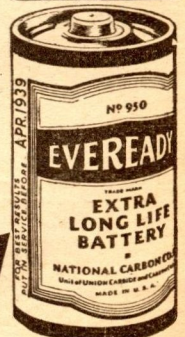
④ "But the steamer did not change her course. She thought we were fishing. The wind blew burning fragments back on the ship setting her afire in various places. I could see the stern light of the steamer going away from us. *If I couldn't stop her, we were all dead men!* I climbed to the fore-top and in desperation pulled my flashlight from my back pocket and in Morse code signalled 'Sinking... SOS... Help!'



⑤ "Slowly, I saw the ship turn! In her last hour afloat, all of us and the cat were saved from the sinking, burning 'Pioneer' by those fine seamen of the United States Liner 'American Banker' and by the power of two tiny 'Eveready' fresh DATED batteries that stood by us in the blackest hour of our lives!

(Signed) *Captain Milton*

FRESH BATTERIES LAST LONGER... Look for the DATE-LINE



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ASTOUNDING

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STREET & SMITH'S SCIENCE-FICTION

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STREET & SMITH PUBLICATIONS, INC.,

79 7th AVE., NEW YORK, N. Y.

IN TIMES TO COME

One of the things that lead to the launching of UNKNOWN, as described on the Editor's Page, was the fact that more first-rate manuscripts than *Astounding* could publish were coming into the office. Now, UNKNOWN will help *Astounding* by offering yet more encouragement and market for those writers who have imagination. The March *Astounding* will offer a collection of yarns that will, I think, prove that.

First, we have *Cloak of Aesir*, by Don A. Stuart. It is one of the very long novelles that your letters have indicated are appreciated—21,000 words, and a sequel to *Out of Night*. *Cosmic Engineers*, Simak's serial which has just set the problem in this issue, begins a movement toward forces and powers of the order E. E. Smith made famous.

Malcolm Jameson has a short—*Children of the "Betsy B"*—which I guarantee as one of the outstanding humor yarns of the new year. It's about a little steam launch that grew up and ran away to sea.

Further on the list of those present next month or in the succeeding months is *Problem In Murder*, by H. L. Gold, returning the reporter-detective of *A Matter of Form*, and *Follow the Bouncing Ball*, the third Josh McNab story by Arthur J. Burks. There's an article, *Toward the Superman*, by Richard Tooker, too, that brings out some extremely interesting points. This designing of human beings to come by controlled breeding of men, it appears, is not such a hot idea as it seems at first glance. Tooker points out that Man's highest success in controlled breeding has been the production of the greatest galaxy of monsters the world has ever known!

THE ANALYTICAL LABORATORY

A number of readers have pointed out that "Nova" is the Latin for "new," and that the idea developed in *A Matter of Form* was not new. Agreed; it was not. The "Nova" designation was taken secondhand—from Astronomy. In the astronomical sense, a Nova is a well-known star which suddenly develops a new and outstanding brilliance. So, an *Astounding Nova* story is one which develops an old and well-known theme with a new brilliance. Most—as the tabulation below indicates—agreed that *A Matter of Form* was an unusually fine development of one of the very oldest science-fiction ideas. (It was taken over from mythology, so it rates whiskers of nearly the same length as the immortality and invisibility themes. Myths called such changed personalities werewolves.)

Comments on the cover lettering change were scattered, but, on the whole, very favorable. Those who noticed the new bookjacket type illustrations commented favorably. I'll be interested to know your opinion on the use of those bookjackets on serials. I plan to have one, symbolizing the entire story, as the opening, and rerun this same bookjacket with each installment, giving you some visual memory to tie in the first installments with succeeding parts. I believe that will help your enjoyment of serials, but if a majority show a preference for different jackets with each installment—it shall be done!

Below, the ratings on the December issue:

- | | |
|----------------------------------|--------------------|
| 1. Tied: <i>A Matter of Form</i> | H. L. Gold |
| <i>The Merman</i> | L. Sprague de Camp |
| 2. Helen O'Loy | Lester del Rey |
| 3. "They Had Rhythm" | Kent Casey |
| 4. <i>The Ephemeræ</i> | Edmond Hamilton |
| 5. "Let Cymbals Ring!" | M. Schere |

The Editor

Make me Prove

THAT I CAN TRAIN YOU
AT HOME FOR A

Good Job in Radio



**Here's Proof
My Training Pays**

**I Will Send You a Sample Lesson
FREE**

Clip the coupon and mail it. I will prove I can train you at home in your spare time to be a RADIO EXPERT. I will send you my first lesson FREE. Examine it, read it, see how easy it is to understand—how practical I make learning Radio at home. Men without Radio or electrical knowledge become Radio Experts, earn more money than ever as a result of my Training.

**Why Many Radio Experts Make
\$30, \$50, \$75 a Week**

Radio broadcasting stations employ engineers, operators, station managers and pay up to \$5,000 a year. Fixing Radio sets in spare time pays many \$200 to \$500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as \$30, \$50, \$75 a week. Many Radio Experts open full or part time Radio sales and repair businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, and pay up to \$6,000 a year. Automobile, police, aviation, commercial Radio, loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I trained have good jobs in these branches of Radio. Read how they got their jobs. Mail coupon.

**Many Make \$5, \$10, \$15 a Week
Extra in Spare Time While Learning**

The day you enroll I start sending Extra Money Job Sheets, show you how to do Radio repair jobs. Throughout your training I send plans and directions that made good spare time money—\$200 to \$500—for hundreds, while learning. I send you special Radio equipment to conduct experiments and build circuits. This 50-50 method of training makes learning at home interesting, fascinating, practical. I ALSO GIVE YOU A MODERN PROFESSIONAL ALL-WAVE, ALL-PURPOSE RADIO



SET SERVICING INSTRUMENT to help you make good money fixing Radios while learning and equip you for full time jobs after graduation.

Money Back Agreement Protects You

I am so sure I can train you to your satisfaction that I agree in writing to refund every penny you pay me if you are not satisfied with my Lessons and Instruction Service when you finish. A copy of this agreement comes with my Free Book.

Find Out What Radio Offers You

Act Today. Mail the coupon now for sample lesson and 64-page book. They're free to any fellow over 16 years old. They point out Radio's spare time and full time opportunities and those coming in Television; tell about my training in Radio and Television; show you letters from men I trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL COUPON in an envelope, or paste on a postcard—NOW!

**J. E. SMITH, President
National Radio Institute, Dept. 9AD
Washington, D. C.**



**OWNS PART TIME
RADIO BUSINESS**

"I am a locomotive engineer with the B. & M. Railroad, and work part time in Radio. In the selling end I have made as high as \$300 in one month and have added to that about \$100 in service work."

—FRANK McCLELLAN, 902 Elizabeth St., Mechanicville, N. Y.

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IN 5 MONTHS**

"Shortly after I started the N. R. I. Course I began teaching Radio classes at the Spartan School of Aeronautics. After five months I was given a chance to join the American Airlines at a salary double that which I received from the school."—A. T. BROTHERS, 741 1/2 Marine St., Ocean Park, Calif.



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"For the last 18 months I have been in business for myself, making between \$200 and \$300 a month. I have N.R.I. to thank for my start in this field."—ARLIE J. FROEHLER, 224 W. Texas Ave., Goose Creek, Texas.



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Has Helped Hundreds of
Men Make More Money**

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SAMPLE LESSON FREE**

**J. E. SMITH, President, National Radio Institute,
Dept. 9AD, Washington, D. C.**

Without obligation, send me the Sample Lesson and your free book about the spare time and full time Radio opportunities, and how I can train for them at home in spare time. (Please write plainly.)

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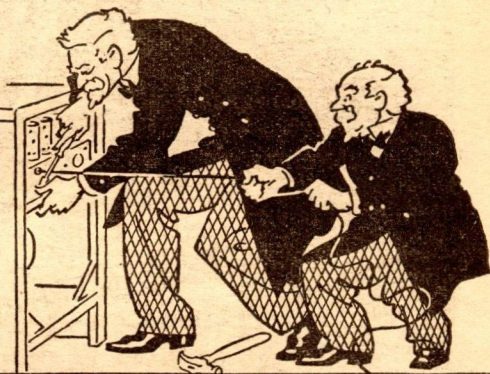
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Mr. Mattingly & Mr. Moore tune in on a bargain in fine whiskies!

"Oh, Mr. Mattingly,
Oh, Mr. Mattingly,
Have you noticed how
our whiskey's specified?"



"Ask the people what their choice is—
And the answer that they voice is:
'M & M—the grandest whiskey
we have tried!'"



"Yes, Mr. Moore,
Yes, Mr. Moore,
Folks on land and sea are
raising gladsome cries..."



"When for whiskey people call,
'M & M!' shout one and all,
It is slow-distilled and mellow ...
its low price is a surprise!"



A LITTLE skill in bargain hunting will lead you straight to Mattingly & Moore...a real whiskey value if there ever was one!

M & M is ALL whiskey—every drop slow-distilled the good, old-fashioned way! What's more, M & M is a blend of straight whis-

kies—and that's the kind of whiskey we think is best of all.

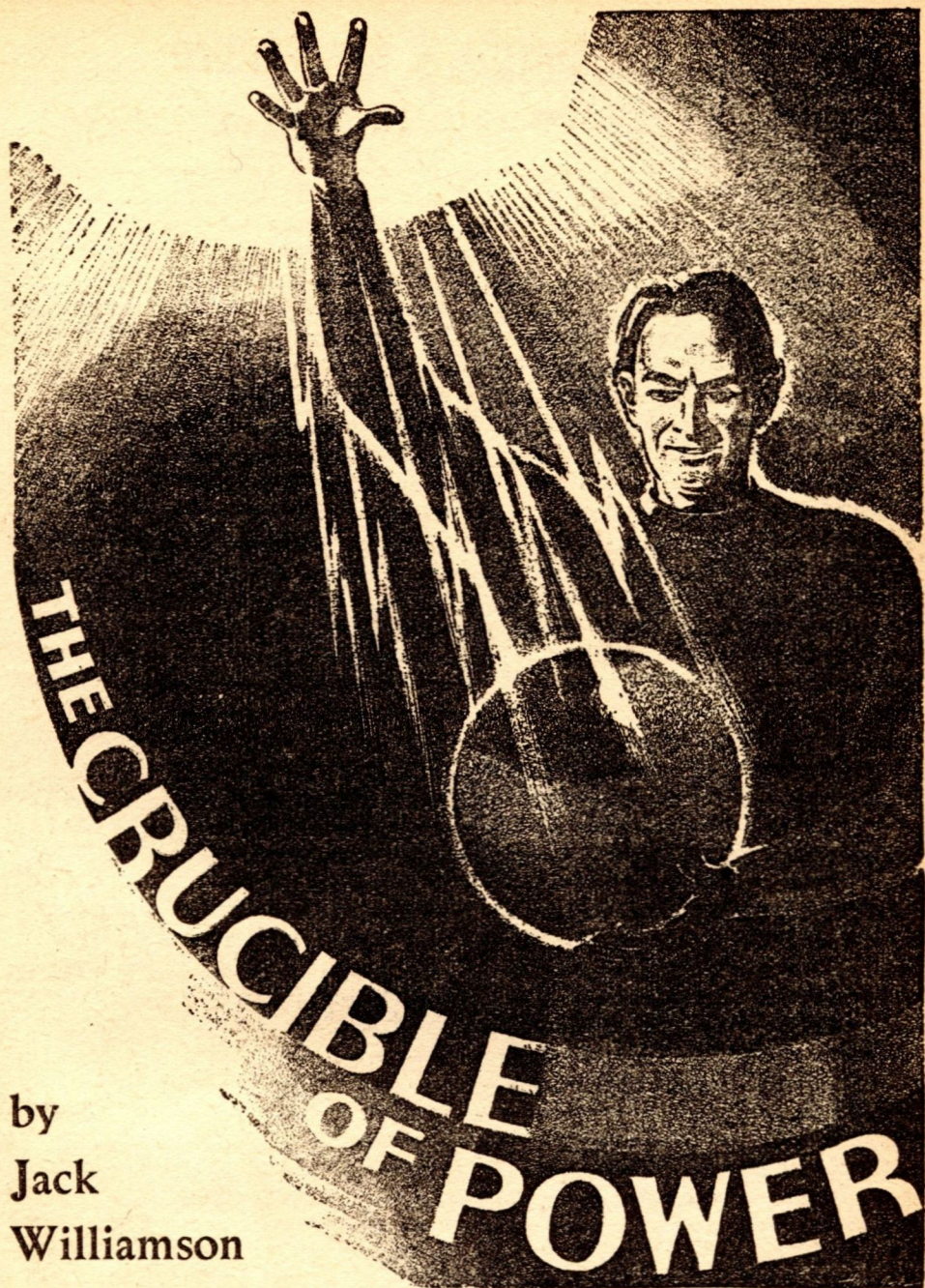
Ask for M & M—today—at your favorite bar or package store. You'll find that its mellow flavor just hits the spot—while its low price is really in tune with your pocket-book!

Mattingly & Moore

Long on Quality—Short on Price!

A blend of straight whiskies—90 proof—every drop is whiskey.
Frankfort Distilleries, Incorporated, Louisville and Baltimore.





by
Jack
Williamson

THIS, my father's story, must begin with the great pandemic that was the background of his life, as it had been, since the twentieth century, the deadly background of human history. The Falling Sickness first attacked

workers in a Greenland radium mine, in 1998. Baffled doctors talked of spores swept to Earth by the light-pressure of the Great Supernova of 1991. More probably, however, the new virus was a radiation-born mutation from some ma-

Jack Williamson tells of a hero unique in science-fiction—a hero whose heart is purest brass!

lignant proteide already known—quite possibly, even, from one of those responsible for the “common cold.”

The disease attacked all nerve tissue. Commonly the ganglions and plexuses of the ear were first affected. The victims were deafened, deprived of sense of balance, usually terrified with a sensation of endless headlong falling—hence the malady’s popular name.

The Falling Sickness struck without warning. People fell suddenly, at work or in the street, shrieking in fear, clutching wildly at objects about them. The infection spread swiftly from the auditory nerve, causing blindness, agonized paroxysms, nightmarish hallucinations, coma, paralysis, often stoppage of the heart, and death.

It is impossible, now, to convey anything of the horror and the magnitude of that pandemic. Only one person in five had a natural immunity, and a frantic medical science failed to find either artificial immunization or successful treatment. A third of the victims were dead in three days, and another third were left blind or hopelessly crippled. In a century and a half, three billions died of it—more than the total population of the planet at any one time.

The clock of civilization was stopped. The brilliant scientific advance of the twentieth century seemed lost in a hundred years of stagnation, dread, and decay. Endless wars rivaled the horrors of the virus.

By 2100, however, mankind seemed on the way to slow recovery. The plague still claimed ten million lives a year, but immunity, by inexorable natural selection, was increasing. Courage began to return. Government, industry, science, and civilization struggled to resume their interrupted march.

MY FATHER, Garth Hammond, was born in the last year of the Black Century. His life might be accounted for in terms of the dark age that produced him. But I beg the visivox listener to try to see him as something more than the end product of a rugged heredity fighting to survive in a grimly hostile environment. For he was more than that. He was more, even, than the daring explorer of space, the stalwart captain of industry, the dashing Don Juan, the heartless capitalist, the greatest philanthropist, the dictator of the solar system and the conqueror of the Sun. Men have called him the most black-hearted, villainous hero the System ever knew. He was all those things, I know. But, also, he was a human being.

He was a tall and powerful man. His quick gray eyes had a keenness often disconcerting. Yet always he kept the ready geniality that came from the days when he was an impecunious and nimble-witted stock promoter. Even after the years had whitened the abundant shock of hair above his ruggedly handsome, black-browed face, he retained a vast attraction for women. My mother was not the first whose heart he broke, nor the last.

Garth Hammond has become the demigod of the whole creed of Success. Billions have been astonished at the penniless boot-boy who rose to be financial dictator of nine worlds. Millions of other boot-boys, I suppose, must have been inspired by his example to frantic application of dye and brush.

It is true enough that once, for a few months, he attended the boots of passengers on a transatlantic stratoplane. But his rise was due to something more than mere industry. He cultivated a pathetic limp, and told sympathetic travelers a

pathetic story of his mother crippled for life by the Falling Sickness—actually she had died from falling down a tenement air shaft when he was two years old. Discharged for such methods of business, he began selling knickknacks and vis-vox spools about the stations. The eye of a young competitor was blacked by a mysterious assailant, and his missing stock in trade discovered to have been mysteriously shipped—collect—to the Mayor of Zamboanga.

That is the beginning, crooked enough perhaps, yet with its hint of the imaginative resource that accompanied my father's ruthless ambition. His commercial career was not really launched, however, until after Cornwall's spectacular voyage to the Moon, in 2119.

Captain Thomas Cornwall was a young ordnance engineer, on leave from the army. His rocket was the first to attain the velocity of escape—11.3 km/sec. His triumphant return, after two weeks on the Moon, won him the world's frantic acclaim. The feat seemed symbolic of the reawakening of man, after the long night of the Black Century. And it showed my father the way to make his first millions.

For he was soon engaged in the manufacture of "Hammond's Lunar Oil." This elixir, secretly concocted on the prescription of a notorious quack of the time, "Dr." Emile Molyneaux, was "warranted to contain essential oils from rare lunar shrubs." It was advertized as a specific for most of the multitudinous ills of the human race. Sales, especially in those parts of the world where the Falling Sickness was still most prevalent, were tremendous.

CORNWALL started legal difficulties with an indignant public statement that he had brought back no plant specimens from the Moon. My father's reply was to finance a lunar expedition of his own.

One Dr. Ared Trent, a lean, brilliant, intense young astrophysicist, had just re-

discovered the cellular principle of rocket construction. Although no larger than Cornwall's, his rocket was far more efficient. He was able to carry two companions and a good deal of equipment, including a dismantled telescope.

The "Hammond's Oil Expedition" remained one hundred days on the Moon, and safely brought back specimens and observations of great scientific value. The adventure was well publicized—and sales of the elixir boomed again.

In order to meet the enormous demand, however, the compound was varied with cheaper chemicals and an increasing amount of water. This, together with Trent's delay about publishing any description of the supposed plant life found on the Moon, brought more legal trouble. There were charges that mistaken dependence on the elixir had resulted in thousands of deaths. My father finally closed the plant.

But Garth Hammond had already harvested millions, and he was ready, now, for a greater enterprise. He was not long in finding it. His first attempt led to disaster—for all but himself. Then Trent's photographic studies of Mars, made from the Moon, precipitated the most momentous events of modern times.

Reborn after the Black Century, industry soon faced a grave "power famine." Reserves of oil and coal were depleted; river and tidal power projects had been developed to the practicable limits; increased demands for food cut off conversion of the agricultural surplus into fuel alcohol; direct utilization of solar power still seemed as much a dream as atomic energy. And power, my father realized, was the key to greatness.

"Power, Chan," he used to tell me, "is power!"

Prices rose; wages sank. The rich were the owners of power sites or fuel reserves; the poor, "power starved," forbidden private transportation, actually hungry, shivered in helpless discontent.

Garth Hammond saw, in this bitter need, a great opportunity. His first, disastrous attempt to grasp it was suggested by his old associate, Molyneux. Pseudo-engineer as well as quack doctor, Molyneux revived an old project: a twelve-mile shaft in the planet's crust, to tap possible mineral wealth and generate power from volcanic heat.

The Volcano Steam and Metals Corporation proved to have been a singularly apt name for the enterprise. For, after a billion dollars had been spent to sink the great pit forty thousand feet, the bottom of it suddenly split. Men and refrigerating machines were drowned in flaming lava. A rain of boiling mud drowned the new city of Hammonds-pit, Virginia, taking twenty thousand lives.

Molyneux was killed in the eruption. Full responsibility for the disaster was somehow placed upon him. All the records of the corporation had been destroyed, and its tangled affairs were never entirely straightened. A fact, however, which used to rouse the ire of luckless investors, was that my father seemed to have lost nothing by the failure of the project.

HE REMAINED prosperous enough, indeed, to purchase an entire island in the Aegean. There he built a marble replica of an ancient Roman villa, complete with all modern conveniences. There he took my mother as a bride—his second wife, she was Sabina Calhoun, frail, lovely daughter of an old aristocracy. And it was there, in 2130, the year after the disaster, that I was born.

It was to that island palace that Trent soon came. Some Napoleonic complex drove my father always onward. He was already restless and uncontent, my mother used to tell me, before that epochal visit, whose results broke her heart and opened the conquest of so many worlds.

Ared Trent had been busy for five

years analyzing and publishing the results of the lunar expedition. He was a lean, tall fellow, habitually silent, methodical of habits, with a brilliant mathematical mind—and now on fire with a stupendous Idea.

"These things on Mars!" His excitement stopped my father's weary stalking through the marble halls. "On the Moon, without atmospheric interference, they photographed unmistakably—and they are *works!*"

He flourished photographs and drawings.

"Engineering works! About both the ice caps there are drainage channels, dams, pumps. Still operating mind you—for I saw square fields turn olive-green in the spring! The Schiaparelli 'canals,' I'm convinced, are cultivated belts!"

He shuffled the photographs, excitedly.

"And here's something else, Hammond—I don't know what." An odd note of awe slowed his eager voice. "A thing shaped like . . . well, like a barrel. It's dark. It's half a mile thick. It stands alone on the desert plain, a few hundred miles northwest of *Syrtis Major*. It can't be natural. Some construction—I can't guess what. But—tremendous!"

I can hear my father's calm question: "Well, Trent. But what of it?"

"Machinery!" cried Trent. "Colossal machines—running! But what is their source of power?" His dark eyes stared feverishly at my father. "Coal and hydrocarbon deposits must have been used up ages ago. Without seas, they have no tidal power. Rare atmosphere makes wind plants ineffectual. Sunshine is only about half as intense as here. Atomic power? I couldn't guess!"

He waved the papers. "No, Hammond, I don't know what they have—but it's something we haven't got on Earth."

"Well, then, Trent," my father calmly announced his decision, "we're going out to Mars, you and I—and get it!"

"To Mars!" The astronomer began to tremble. "Mars—if we could! What an opportunity!" His dark head shook. "But wait, Hammond! It's hundreds of times as far as the Moon. Enormous technical difficulties. Trip would take two years, between oppositions. And cost millions!"

"I've got the millions," said Garth Hammond. "You can build the ship. We're going!"

MY FRIGHTENED mother pleaded in vain against the project. My father returned to America with Trent the very next day, to begin the preliminary arrangements. My mother, in frail health since my recent birth, remained on the island. He did not come back to live with her. His fancy soon turned to the visivox actress, Nada Vale. The next year my mother was quietly divorced, given the island home and a generous annuity. She was still devoted to Garth Hammond, and the separation was a hurt from which she could not recover.

The Martian ship was two years building. Finished in 2132, it was a four-step rocket, each step containing thousands of cellules, each of which was a complete rocket motor with its own load of "alumiloid" fuel, to be fired once and then detached.

The rocket stood on the summit of a mountain: a smaller mountain of glittering metal, tapering toward the top. A spidery ladder led up to a high, tiny opening. Bright sun shimmered on the metal and on the snow, but the December wind was bitterly cold. My mother lifted me off the snow, and so I found that she was sobbing.

Trent and two others climbed up the ladder. Garth Hammond waited, his smile flashing, talking to a crowd of newsmen. Someone pushed through and

thrust a legal paper at him. The investors in the power pit were still bringing suits and getting out injunctions.

I heard my father's roaring laugh, and saw him tear the paper in two.

"They say the arm of the law is long," his great voice boomed. "But so is the road to Mars."

He whispered something to my weeping mother, and patted me on the head.

"You used to reach for the Moon, Chan," he said. "Well, I'm going to bring you something bigger."

He turned to mount the ladder, and then I saw another woman clinging to him. She was Nada Vale, the red-haired actress. I thought that she was beautiful, though I knew my mother didn't like her. She was crying wildly, and hanging to my father. He pushed her away, and swiftly climbed the ladder.

"Garth! Garth!" she was screaming. "You'll be killed! You'll never come back!"

White-faced and silent, my mother took me down to the little village. From the window of our room in the small hotel, we could see the rocket, like a shining crown on the mountain. A siren moaned. Mother caught her breath. The whole mountain was suddenly swept with smoke and fire. Windows rattled, and there was a huge roar of wind and thunder. And mother pointed out a tiny speck, trailing fire, vanishing in the sky.

"Your father, Chan," she whispered. "Off to Mars!" She sat a long time, holding me tight in her arms. I was afraid to move. "That Nada Vale," she breathed at last. "I . . . I'm sorry for her."

We went back to the island, and waited. The whole world waited for the next opposition, when they should return. Astronomers watched the Red Planet, radio hams trained loops on it. But there was no sign or signal. My fifth birthday came and passed. Hur-

ting Earth overtook Mars in its orbit, and left it swiftly behind.

And still my father did not return.

II.

FOR EIGHT minutes that seemed eight centuries the four men in the ship were deafened and battered and mauled by the wild force of the rockets. Then followed sixty-seven days of silent monotony, as inertia flung them out toward the orbit of Mars.

The nine tons of "pay load" included concentrated supplies carefully calculated to last two years; the stock of manufactured goods, chemicals, metals, and jewelry, which my father hoped to trade for the precious secret of Mars—and the arsenal of rifles, pistols and grenades, machine guns, a 37 mm. automatic cannon, and an especially designed automobile howitzer firing incendiary and demolition shells, which he planned to bring into use if the secret were not voluntarily forthcoming.

The two other men had been carefully selected. Burgess was a famous power engineer, who was also a linguist and therefore an expert in communication. Schlegel was a German artillery engineer, who had been military adviser to a dozen different revolutionists in that many countries, and was reputed to be worth two divisions. The four had drilled and practiced for six months with the weapons aboard—quite unaware of the disaster waiting.

Every day the Red Planet grew. Engineering works and cultivated strips became unmistakably clear. And gray rectangular patches hinted of—cities?

"Cities they are!" at last Trent cried. "And I've seen motion—some moving vehicle! Yes, Mars is alive, Hammond. Alive—but dying. Most of the fields are dead and brown. Most of the machines are stopped. Most of the cities are already drifted with the yellow sand.

"And that . . . that thing, alone in the desert—"

He turned the telescope again toward that chief riddle of Mars.

"Looks like a rusty metal barrel," he whispered. "Round in the middle, with hexagonal ends. Three thousand feet tall! And standing there alone, far from the nearest city, deserted. Its shadow like a mocking finger pointing— *What* could it be?"

"Land near it," my father said, "and we'll find out before we call on the natives."

Trent eagerly agreed. But, when at last the ship was hurtling moonlike about the planet, braking her velocity in the upper atmosphere, one of the cellulules in the second step exploded. Years later, a man named Grogan, whose family had all been killed in the power-pit disaster, confessed to willful sabotage in the plant where the cellulules had been made. The electric firing system was wrecked. The ship plunged down, out of control.

Frantic effort averted complete catastrophe. Trent detached the entire second step, began to fire the third. But controls were completely wrecked, and the cellulules began to fire one another by conducted heat.

Realizing that only a few seconds were left, Trent opened the valve, in desperate haste, to the rare atmosphere of Mars. Both of Schlegel's legs had been broken by the fall. My father helped him out of the wreck, took him on his back, and ran after Trent and Burgess.

Behind them, the thousands of cellulules were thundering and vomiting out a mountain of smoke and fire. They had staggered only a short distance when there was a terrific final explosion. Metal fragments shrieked about them. The German's head, beside my father's, was blown completely off. Burgess received a wound in the chest from which he died after Trent had removed a scrap of ragged steel.

BOTH INJURED, Trent and my father survived. But their plight seemed grave enough. Food, water, and oxygen masks were lost. They found the air of Mars, on account of its relatively high oxygen content, breathable, but it did not allow violent or sustained exertion. Their stock in trade was lost, also the collection of models, pictures, books, radio and motion-picture equipment, with which they had hoped to establish communication. The weapons were gone, and their fighting man. Final and most crushing blow, return to Earth seemed forever cut off.

Blackened and bleeding, Trent stood looking back at the wreckage, wringing his lacerated hands.

"My free space observations," he was moaning. "And all our equipment—"

"Hammond Power has taken a tumble, all right," my father agreed, and gasped painfully for breath. "But we aren't sold out!" He wiped at the blood that kept trickling into his eyes, and stared about the flat, desolation. In every direction swept an interminable waste of low, rusty dunes. "Where"—a wisp of acrid saffron dust set him to coughing—"where are we?"

"Ten degrees, probably, north of the equator." My father's head still rang from the blast, and Trent's voice, in the thin air, sounded very small and far away. "At least a thousand miles west of that barrel-thing."

My father stared at him and up at the shrunken Sun.

"The night—"

"Unless we find shelter," Trent agreed, "the night will kill us." He peered southward. "There's a settled strip. I had just a glimpse, as we came down. Maybe ten miles. Maybe two hundred. I don't know how fast we were moving."

My father nodded suddenly. "We can try. Let's go."

"First," Trent said, "the others."

Very hastily, panting with the effort,

they covered Burgess and the German in shallow sand graves. A brief search of the vast shell hole where the rocket had fallen revealed no useful article intact. Empty-handed, clad in torn, scorched rags, they plodded southward across the dunes. My father was wearing a pair of inadequate soft slippers. They soon fell apart, and he went on barefoot.

"Hammond Power," my father whispered, and coughed again. "Two queer beings on Earth would probably wind up in some zoo—unless some panicky citizen shot them first! Their chance to learn, say, the science of sub-electronics—" He shook his head. "Do you suppose they saw us?"

"Possible," said Trent. And, within an hour, they knew that their arrival was known. For a small bright-red aircraft, which had a double streamlined shape, like two thick cigars fastened side by side, came silently over the dunes from the south.

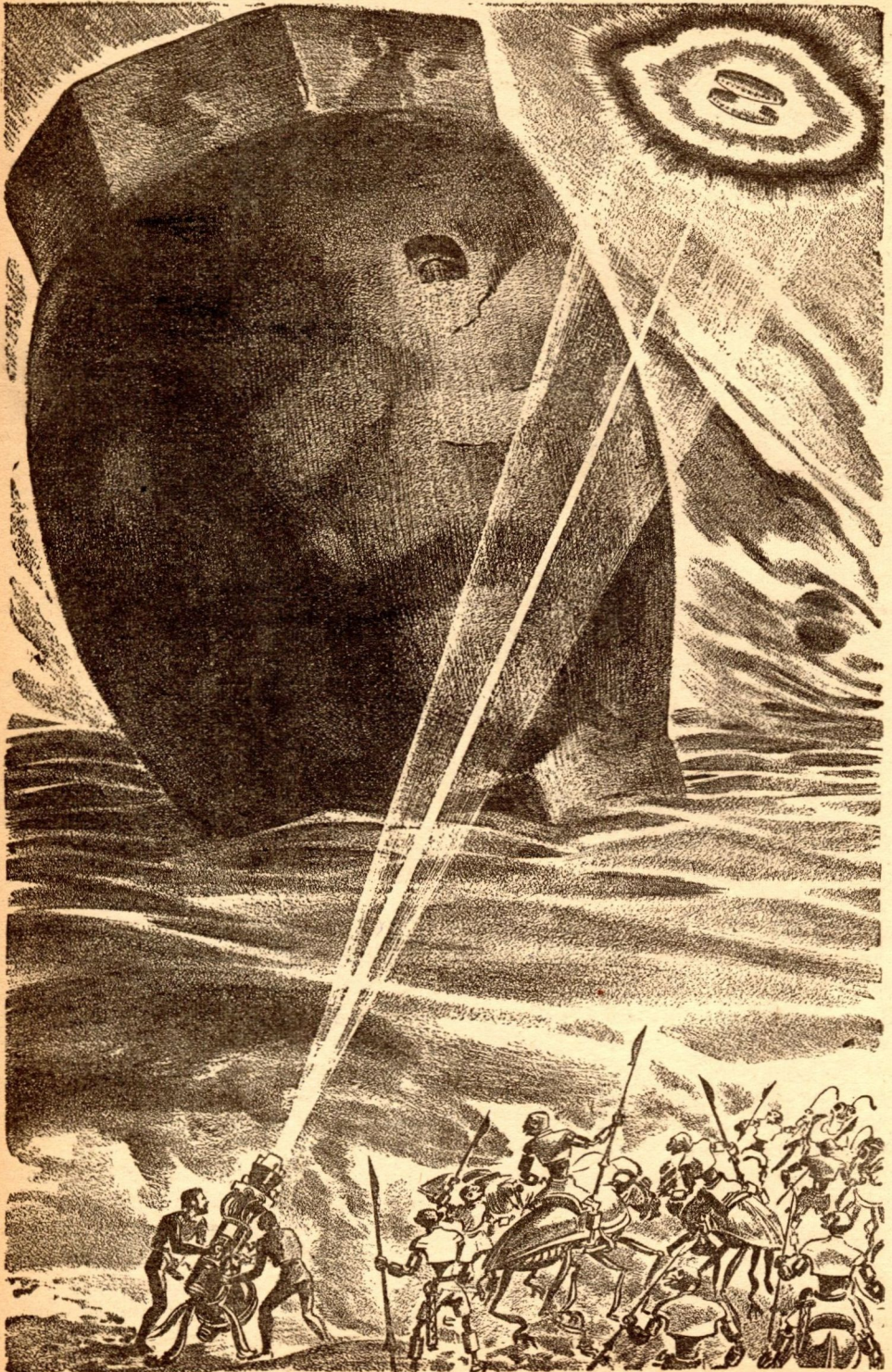
The two men, in a sudden panic, tried to hide in the sand. The machine circled noiselessly above the wrecked rocket, and then flew back above them, without landing. They ran after it, at last, waving and shouting frantically, but it paid them no heed.

THEY STRUGGLED on. The rarefied air, Trent commented, and the lesser gravitation, tended toward a physiological balance. But both were coughing. Their lungs had begun to burn. Trent discovered that he had a rising fever.

Both were tormented by extreme thirst, as the dry atmosphere sucked moisture from their bodies. And there was no water.

The small Sun was low and red, and a thin, piercing, icy wind had sprung up out of the east before they saw the first actual Martians. It was Trent who looked back from the summit of a low dune, gulped voicelessly, and pointed.

The Martians came following the two sets of plodding prints in the sand. They



Shadowed by the ageless bulk, they waited till the Martian ship came.

rode yellow, ferocious-looking armored beasts that hopped like gigantic fleas. They wore bright leatherlike garments, and flourished gleaming weapons and rode astride and upright, like men.

Like men. That unexpected pursuit filled Trent and my father with a sudden blind fear. They fled uselessly across the dunes. But still, so strong is man's anthropomorphism, they thought of those wild riders in essentially human terms.

Actually, perhaps, the dominant beings of Mars proved more manlike than the explorers had any right to expect. They were bipeds, walking upright. They had two-eyed faces of a sort. They communicated with a guttural, rasping speech.

For all that, however, the Martians have more in common with the arthropoda. Horny exoskeletons and fine-meshed scales instead of skin, with muscles and vital organs shielded in tubular armor. But in the chemistry of vital fluids and metabolic processes, in the subtler psychological reactions, they are like nothing on Earth.

This small mounted band had trailed Trent and my father from the wreck. One of the hopping beasts was laden with scraps of twisted metal, and some of the beings had bits of Burgess' and Schlegel's blood-soaked clothing.

The flight was soon ended. The Martians carried long red lances whose hollow metal shafts, it swiftly developed, served also as guns. Angry bullets kicked up rusty dust. The savage riders shrieked. The leaping beasts made a dismal and blood-chilling baying.

Trent stumbled, suddenly, and couldn't rise. My father stopped beside him, breathless, with his lungs on fire. The gaunt, inhuman riders bore down upon them. They were an appalling lot, with their unfamiliar visages and their fine-scaled skins brightly hued in red, yellow, and purple. They surrounded the two men, and leapt down to rescue

them from the fangs and talons of their beasts.

The men were hastily bound to a sort of packsaddle on one of the beasts, and the band turned northward again. The red double ship appeared again, before sunset, following from the south. The riders scattered, and began to fire at it with the long red tubes. It circled high above them, dropped a bomb that lifted an ineffectual pillar of dense, angry dust, and returned once more toward its unseen base.

EVENTS confirmed my father's surmise that their captors were nomad enemies of the "canal" dwellers. That night, long after dark, the fugitive band took refuge in a labyrinth of burrows that must have been dug by the powerful claws of the hopping creatures. The captives were fed and allowed to sleep. Before dawn, the march was resumed. The respiratory trouble of the prisoners became more serious. Both sank into a fevered delirium. By the time they began to recover, the band had taken refuge in a hidden ravine where a tiny spring supplied water and grew a little forage for the beasts.

There they were held for several months, gradually learning a little of their captors' language and a few facts about them. Leader of the band was a gnarled, haggard, long-limbed savage, of a rusty-red color, named Zynlid. He and his outlaw clan maintained themselves by raiding the fields and cities of the canal dwellers, keeping up an ancient and bitter feud with the rulers of civilized Mars.

When my father recovered from the pulmonary fever, he grasped again his original audacious object: to obtain the secret of the Martian power plants. That alone, he told Trent, would possibly enable their return to Earth.

Zynlid must have taken the two men partly out of mere curiosity, and partly from the hope of ransom. The canal

dwellers, it seems, refused to bargain for the prisoners. But, out of their first efforts at communication, came a new and puzzling prestige.

The gaunt chieftain's notions of astronomy, it developed, were rather vague. From Trent's attempts—with drawings on the sand and gestures at the sky—to show that they had come from the third planet, Zynlid jumped to the idea that the two were natives of the Sun.

And his regard for beings of the Sun was considerable. He ordered their bonds removed, offered them choice food, drinks, and female companions, gave them liberty of the camp, and allowed my father to ride with him on future raids. Trent and my father made no attempt to disabuse him of the misunderstanding.

Their questions were now eagerly answered, but it was some time before they were able to make any intelligible query about power. Meantime, Trent was allowed to examine the few machines in the possession of the nomads. These included the long guns and the equipment that gave light and heat in the dwelling-burrows.

The savages, it seemed, had no comprehension of the operation of these machines. There was a taboo, moreover, associated with them, so that Zynlid was horrified when Trent first began to take a little heater-lamp apart, and permitted him to go ahead only on reflection that he was a solar being.

Trent himself made little of the investigation. The machines were electrical—even the rifles were fired by the sudden vaporization of water with electricity. The current came from little transparent tubes. These were hollow, with a metal electrode fused in one end, and a lump of a curious greenish crystal in the other. In the space between were a few tiny specks of dust, that had a silver-blue color and gave off a pale blue light when the tube was working.

"It's that dust, Hammond," Trent told my father. "A pinch of it will generate thousands of kilowatts, evidently. Lord knows what it is!"

The outlaw chieftain, when they had more of his confidence and his language, could only tell them that the fine blue grains were "dust of the Sun." They came, he said, "from the place of the Sun." And it was forbidden for others than the *gorath-zwein*, the "blood of the Sun," to touch them. He himself refused even to look at Trent's dismantled mechanisms.

PRESSED by my father and excited by his own scientific enthusiasm, Trent continued his fumbling experiments until a day when he was almost killed by the terrific explosion of a grain of the blue dust. Fragments of a metal crucible drilled his body like rifle bullets. He was helpless for a month.

"It's got me, Hammond," he admitted hopelessly. "Atomic energy? I don't know. There's no key—unless we can get it from the civilized tribes."

The accident lowered their prestige as beings of the Sun. Muttering of "the wrath of the Sun" and "the revenge of the holy stone," Zynlid forbade Trent, on his recovery, to continue the experiments. And it might have gone much harder with the two men had not my father already become a trusted companion of Zynlid.

That lawless, marauding life seems to have appealed immensely to Garth Hammond. He flung himself into it with his old shrewd daring and all the strength of Earth-muscles. There was a duel with one of Zynlid's chief lieutenants, who was jealous of the warrior of the Sun. My father killed the savage, and thereafter found himself in possession of the dead Martian's weapons and mount.

Although excessive effort soon made him breathless, so that the band nicknamed him "the panting one," he was able to outdo them all in wrestling and

contests of strength. He took a keen delight in the strategy of raid, escape, and ambush. Zynlid began to rely on his cleverness. His belt was soon bright with the vivid-hued ear-appendages of the canal folk, taken as trophies.

He discovered, presently, that the band knew of the immense dark barrel-shaped object that Trent had observed from the Moon. They regarded it with considerable awe. It was the *Korduv*, the "place of the Sun," or sometimes "place of the holy stone." And all save the *gorath-wein* were forbidden to approach it.

"There's your key," he told Trent. "There's where the silver dust comes from."

As soon as Trent had recovered sufficiently from the explosion, my father arranged an expedition to take them near the mysterious object. The Martians refused to go within a hundred miles of it, and allowed Trent and my father to approach it only on fresh assurance of their solar birth.

A vast excitement fevered them as their yellow-armored leaping dragons brought them in view of the dark mass looming above the flat and limitless red dunes. Was this the key to exhaustless power and the road back to Earth?

For many miles they rode forward across the desert, and the red-black enigma loomed vaster and vaster before them. At last, riding through the cold black shadow of it, they came to its base.

Its stupendous mass was metal, they discovered, pitted with the acid of untold centuries, crusted with dark-red oxides. The dunes were drifted against it; westward the winds had cut out a vast curved hollow. Stunned with awe, they let the beasts carry them around its vast hexagon, and then withdrew to stare upward at it.

THERE WAS no possible opening in its base. Fifteen hundred feet upward, my father saw a square recess that

looked like a portal. But that was in the overhanging, cylindrical middle section. There was no possibility of climbing to it. At last, no wiser, they turned back to their rendezvous with Zynlid—to be greeted with an awed surprise that the Sun had permitted their escape.

"These *gorath-wein* have got the key, Trent," my father concluded. "And we've got to have it."

And he began to discuss with the somewhat horrified Zynlid plans for abducting Anak, who was "Lance of the Sun," and priest-king of the civilized Martians, ruling from his Sun-temple in the city Ob.

"Anak knows secrets of peril," warned Zynlid, apprehensively. "And he is guarded by the hosts of the Sun."

"We know secrets also," my father retorted. "And the Sun sent me to take the place of Anak, who is an impostor in the temple."

Still seeking to convince the old nomad, he called on Trent for scientific miracles. All Trent's equipment had been lost in the wreck. An effort to demonstrate gunpowder now failed for want of free sulphur. But at last the astronomer, if he still failed to grasp the mysterious principle of the blue dust of power, was able to repair and operate certain mechanisms that the outlaws had captured.

One that had lain a mystic but useless relic, gathering dust in a secret treasure-cavern for a full Martian century, now proved to be a weapon. A score of the enigmatic little tubes fed a Niagara of power to transformers and field coils. Its polar plates projected a tight beam of magnetic energy, whose terrific hysteresis effect could fuse metal at twenty miles distance.

The triumphant demonstration of this rusted war-engine restored all Trent's shaken prestige, and secured full support of the nomads for my father's daring plan—although most of them must have been secretly trembling with dread

of Anak and his solar powers.

It was known that the priests of the Sun visited the inexplicable lonely mass of the Korduv at intervals, by air. My father packed the magnetic weapon on one of the hopping creatures, and carried it to a point fifty miles from the stupendous barrel-thing.

There, braving the heat and the cold, the thirst and the dust of the open desert, he and Trent and a handful of the nomads waited for thirty-eight endless days. At last a double red ship came soaring over the dunes, toward the dark, far-off pillar of the Korduv. The outlaws were suddenly terrified.

"The *gorath-wein!*" came their hoarse, uncanny croaks of fear. "Flee! Or the Sun will slay us all!"

They scrambled to prod their beasts from the sand-burrows and mount them. But the invisible ray, with Trent and my father feverishly busy at the unfamiliar controls, brought down the red ship. The flight turned to a mad attack on the fallen machine.

Three priests and a priestess aboard were slaughtered. The only survivor was a young female child. Anak, whom my father had hoped to capture, had not been aboard. He soon discovered, however, that the Martian woman had been consort of the priest-king, and that the infant, Asthore, was his daughter.

Another red ship, sent no doubt to investigate the fate of the first, was also brought down. From the wreckage of the two, aided by two Martians captured in the second, Trent set out to put together one complete vessel. He worked day and night. The outlaws helped, and cheerfully tortured the two prisoners whenever they became reluctant.

BEFORE the ambitious task was done, however, a land force appeared, marching from the direction of Ob. There were two great machines like tanks, and a hundred lancers on foot. In the desperate battle that followed, Trent

never left the ship and his reluctantly persuaded instructors. He was just learning the principle of the ship's propulsion, by a system of gravity-shielding "spacial fields."

For a time the situation looked very bad. My father was able to cripple both war machines with the magnetic ray. But then a similar ray from one of the tanks discovered and fused his own weapon. The bright-scaled lancers charged, howling triumphantly.

My father gathered his five or six allies at the crest of a low yellow dune, and waited for the charge. As the yelling lancers came down the opposite slope, he walked boldly out alone to meet them, with the grave statement that he was their new ruler, sent from the Sun.

That halted proceedings for a ticklish half-hour—until Zynlid arrived with the balance of the bandit band. That was the signal for all hands to fall upon the lancers. They were cut down, to the last Martian. There were new weapons for every outlaw, and my father made himself a triumphant wreath of ear appendages.

Next day, as scouts brought word that all the eight surviving cities were sending contingents of warriors to Ob, Trent finished his repairs and safely flew the ship. The nomads triumphantly butchered the two captive priests, and ate their brains and livers in a ceremonial feast.

My father sent Trent aboard the ship with a crew of nomads and the little Martian girl, back into the northern desert. Zynlid, his hopping beasts laden with the spoils of victory, started back toward the hidden ravine. And my father rode alone toward the city of Ob.

After three lonely, grim days, parched and sunburned and chapped with alkali dust, he guided his beast into the "canal"—a belt of fertile, dark soil, irrigated from underground conduits and covered with low-lying, thick-leaved plants. He

parleyed with the warriors who came to meet him, and they conducted him, half a prisoner, into the city.

Dark buildings sprawled flat and massive behind the walls and hedges that held back the seas of yellow sand. Although the city had several thousand inhabitants, and the central part about the towering conical Sun temple was now thronged with the lancers gathered to avenge the outrage against the sacred ship, by far the greater part of Ob was mere crumbling ruin. Its gaunt, bright-scaled people seemed to my father like lonely ghosts, trying to haunt a far-spreading necropolis. Mars was far gone in death.

Stating that he was an ambassador from the Sun, my father demanded audience with Anak. Suspiciously, yet with respect born of the unprecedented disaster to the sacred ship, the lancers took my father to the ancient, many-terraced pile of crumbling black masonry that was the temple. There Anak met him.

THE RULER was a tall, gaunt Martian, stiff with pride. Age had darkened his lustrous scales to a purple-black, and the horny carapace that crowned his egg-shaped head was crimson. His dark face was lean, hawklike, deeply wrinkled. Jet-black, yellow-rimmed, his eyes flamed with virulent hatred.

When my father advanced his old claim to being a dweller in the Sun, Anak shot him a look of startled incredulity that hinted of an astronomical lore greater than Zynlid's. Ungraciously impatient, he listened. My father told him that his wife and baby daughter were prisoners, and that they would be released safely only in return for certain information.

What information?—Anak wanted to know. When my father began to hint that it dealt with the mysterious power tubes and the enigmatic mass of the Korduv, the priest-king burst into a

savage rage. He snatched at a weapon, rasped and croaked and hissed like something reptilian.

Finally, menacing my father with a level lance, he champed out the gutturals: "Base and lying stranger, whencesoever you come, I, the true Lance of the Sun, know you never dwelt in his sacred fires. The foul dogs of the desert may believe your imposture, but not I. The holy flame of Life would consume you in an instant."

The red shaft thrust viciously.

"I love my wife Wahneema," grated Anak. "I love my child Asthore. But better that both should perish by your tortures than that I should desecrate the secrets of the Sun. Go back to the evil beasts that sent you, and die of the Sun's flaming anger."

All my father's desperate threats and promises—even the ingenious hint that a space fleet was on its way from Earth to rescue him and conquer Mars—proved in vain. Anak grimly resigned him to "the judgment of the Sun."

The Martians kept his beast, stripped him of weapons and clothing, and finally released him, naked and alone, in the midst of a sand desert far southward of Ob. This was remote from the usual haunts of the outlaws, and death of thirst and exposure seemed a certainty—until Trent, who had been spying from the sky, picked him up with the captured ship.

Two nights later, with Zynlid and a picked band of his men, they landed the ship on the topmost terrace of the Sun temple. Under the feeble spark of Phobos, creeping backward across the sky, they slaughtered the surprised temple guard. My father led the howling bandits down into the ancient pile. They found Anak, standing beneath a glowing yellow disk in a chapel of the Sun. He fought savagely, gravely wounding the outlaw chief. But my father snatched away his lance, and he was dragged aboard the vessel before the roused

horde of warriors could reach the roof from the temple courtyard.

The ship launched upward with bullets ringing against her hull. Triumphant, my father commanded Anak to answer Trent's excited questions. But the wrinkled old priest refused to talk. Cheerfully jesting, the outlaws began to apply torture. But the seamed dark face merely stiffened stoically.

It was Zynlid, after Trent had patched up his wounds, who solved the difficulty.

"He will never talk willingly," rasped the old bandit. "Give him this. It is a key to locked lips."

And he handed Trent a tiny hypodermic, loaded with a few drops of some colorless liquid. The drug seemed to resemble scopolamine in being a sort of "truth serum." It ended Anak's stubborn silence, and Trent at last began to learn the secret of the blue power dust.

THE OLD PRIEST was kept drugged for nearly two months, constantly questioned—except on one occasion, when the injection must have failed to take effect. Then, feigning the influence of the drug, he told a series of clever lies and pretended to demonstrate another secret of the dust. Only my father's vigilance and a sudden tackle prevented an explosion that would have annihilated them all.

Finally, they took Anak into the colossal metal hull of the *Korduv*. The frantic searchers from Ob somehow discovered their presence there. My father closed the lofty entrance valve, and, with Zynlid and his band, held it for three weeks against the desperate attackers, while Trent questioned the drugged ruler, explored all the mysterious depths of that ancient desert enigma, and made complete plans of all its colossal mechanisms.

Slowly, the astronomer pieced together the solution to the riddles of the blue dust and the *Korduv* and the limit-

less power that drove the engines of Mars—and found it an astounding revelation. The strange granules, which they came to call "sunstone," had come, quite literally, from the Sun!

Trent came at last to my father, in the beleaguered valve, trembling with the import of his discoveries.

"This is a ship!" he made the startling announcement. "The *Korduv* is an interplanetary ship. It was built nearly half a million Martian years ago, when the planet was at its peak of civilization. It has made thirty trips to the Sun, at intervals of ten or twenty thousand years, for sunstone."

"Sunstone?" echoed my father. "The power-dust?"

"Pure power!" cried the scientist. "Frozen, portable power—power storage, perfected to the last degree. It is condensed radiant energy—a complex, not of atoms and electrons, but of pure photons.

"Light particles, fixed! The mathematics of it is revolutionary. A radical extension of quantum physics! It also accounts for the gravity-reflecting space warp that lifts the ship, and the same field of strain can be modified to reflect radiant energy, for protection against any excess of the solar radiations.

"With a crew of two thousand Martians—the race, in those days, was more numerous and more venturesome—the *Korduv* was navigated a hundred and forty million miles into the solar photosphere. For ten years it floated there, its crew protected by the fields from a gravitation eighty times that of Mars. Its conversion cells absorbed the energy of the Sun, at a rate that amounts to fifty horsepower per square inch, solidified it into the photon dust. And finally, when the ordeal of heat was ended, the survivors—usually not a tenth of the crew—came back with the precious load of sunstone."

"Eh!" My father stared at Trent,

digesting this. A dull hammering throbbed faintly through the colossal valve. His weary, bearded face set with triumphant decision. "A ship!" he whispered. "Then we'll take it to Earth, unload what dust is left, and send it to the Sun for more."

TRENT SHOOK his shaggy, emaciated head. "The *Korduv* won't move again," he said. "It was damaged in the last voyage—that was fifty thousand years ago. Some of the cells failed, and unconverted energy cooked most of the crew and fused half the field coils. A narrow escape from falling into the Sun. The rest of the coils, overloaded, were pretty well burned up on the way back. The thing crashed here. The rest of its crew were killed, but the sunstone was intact."

"Wrecked, eh?" My father stared into the strange maze of Cyclopean engines that loomed within the faintly blue-lit gloom beyond the valve, and demanded, "Why didn't they build another?"

"Racial senescence, I guess," said Trent. "They stopped growing, and went to seed. Take old Anak. He knows scientific facts that we wouldn't have discovered, on Earth, for a thousand years. But they're frozen, dead. His knowledge is all in the form of elaborate, memorized rituals, mingled with superstitious dogma. He is ruled by the past. Half his knowledge is too sacred to use outside the temple. Any new fact would be rank heresy to the Sun. There is sunstone left to keep the pumps running for two or three thousand years. After that, Mars is doomed. 'By the will of the Sun.'"

"Well!" My father shrugged impatiently. "If this is wrecked, can you draw plans for another?"

"For a better one, Hammond," Trent assured him. "If we were back on Earth."

"First thing," my father observed,

"we've got to get past our fanatical friends on the outside—but Hammond Power has gone up a thousand points!"

While the partisans of Anak continued to batter at the great valve, Trent spent three days fitting the little red ship for the Earthward voyage. Its double hull already sealed hermetically, the dusky depths of the *Korduv* yielded cylinders of oxygen, bottled for fifty thousand years. The hold was filled with sunstone, and certain changes in the wiring of the field coils adapted its drive for the interplanetary trip.

Then a tiny sunstone bomb opened a new port in the crown of the *Korduv's* hull. The little red vessel darted out through the gaping plates, escaped the ray batteries and aircraft of the attackers, and fled safely through darkness to the outlaw's hidden ravine.

Old Anak, with his infant daughter, was released at dawn on the desert a few miles from Ob. He learned now that the mother of Asthore had been killed, and he retained memory of all that he had revealed beneath the drug. Rage and horror overwhelmed him. His drawn, dark-scaled face twisted hideously, and his black eyes flamed. He made a desperate, empty-handed attack on my father, screaming prayers and curses.

"Beware!" he was shrieking, as the vessel rose. "Desecrators of the holy fire, beware the judgment of the Sun!"

Zynlid had accepted my father's invitation to visit Earth, with a slave and his two favorite wives. A final raid supplied the vessel with food for the voyage, and Trent guided it out past Deimos into the gulf of space.

The whole Martian year was already gone. Earth had passed conjunction and was pulling swiftly ahead on its orbit. The rocket could never have overtaken it—but half an ounce of sunstone drove the Martian flier eighty million miles in only ten days.

In November, 2134, the red ship

landed safely in a cornfield near New York. My father announced triumphantly that he had secured the secret of Mars—a cheap source of illimitable power.

III.

I CAN STILL remember how my mother trembled, in her cool, silent, sweet-smelling room, above the twilight Aegean, as her frail, unsteady hand snapped the new visivox spool into the cabinet.

"Now, Chan," she whispered, "you . . . your father!"

She choked, and I knew that she was crying.

The little screen flickered and lighted. I saw the golden tangle of the broken stalks of corn, and the tiny ship from Mars lying across the rows, like twin red spindles side by side. A small door opened, and Trent and my father came out.

They were queer-looking men, haggard and shaggy and darkly tanned. My father wore the strange leather garments of the nomads, brilliant with the dried, shell-like ear appendages he had taken. He flourished a long red lance, and his voice croaked a guttural greeting in an unfamiliar tongue.

But his old smile flashed, infectious as ever, behind the great tangle of his black beard. His strong teeth shone. His gray eyes had squinted a little, against the desert glare, but still they were clear and shrewd and quick.

"He's just the same, Chan," sobbed my mother. "Your father . . . oh, *Garth!*"

Her thin face was white, and I saw the great tears on her cheeks.

Newsmen shot swift, excited questions, and visivox machines were humming. My father bowed grandly, and then beckoned. The Martians came scrambling after him—gaunt, rusty-red Zynlid and his varicolored, red-crowned companions. Their movements were

awkward and laborious, and their breathing seemed troubled. They blinked bewilderedly at the feverish, barking newsmen. Garth Hammond stepped before them, and bowed again, and made a little speech of greeting to the Earth.

"To every man," he promised, "I will bring more power than a king enjoyed of old. Tomorrow, the Sun Power Corporation—"

Then Nada Vale, the red-haired actress, came running into the picture. With an eager, muffled cry, she threw herself into my father's great tanned arms. His old smile flashed eagerly. He lifted her, and crushed his great black beard against her face.

Then, suddenly, my mother stopped the machine. A moment she stood beside the cabinet, frozen, her face set and white. A thin sob burst from her quivering lips. She ran quickly out of the room. I found her sitting in the darkness on a terrace high above the black sea where the stars danced and vanished, shaking to dry, breathless sobs.

The conqueror of Mars became the hero of the Earth. That wild tide of enthusiasm drowned all the old accusations against my father. The capital of six billion dollars, for the Sun Power Corporation, was all subscribed in one hectic day.

Tens of millions paid fat admission fees to see Znylid and his ménage, in the gravity-shielded, air-conditioned apartment my father provided. The old bandit used to strut proudly before the curious, flourishing his weapons and trophies, and demanding staggering sums for posing for the visivox.

THE TEMPEST of publicity seemed to mean nothing to Ared Trent. The public hardly realized that my father had had a companion on Mars. Stern, taciturn priest of science, if Trent had a human side, the world didn't know it—not then. He gathered sixty skilled

draftsmen, in a closely guarded office building, and began drawing up the plans and specifications for the Sun Power Station.

Far smaller than the ancient Korduv on Mars—only a thousand feet in diameter and fifteen hundred long—the Station was still the greatest engineering feat ever attempted on Earth. The construction took over three years. Directly and indirectly, more than a million men were employed on it. The first six billions were spent, and bonds floated for three billions more.

Unlike the Martian plant, the Station was intended to float permanently in the Sun's fiery atmosphere. Ships shielded by special fields would visit it at yearly intervals, to carry supplies and relief to its crew, and bring away the precious sunstone. Eight hundred volunteers were selected, to spend one or two years exiled to the flaming terror of the Sun.

Designer of the Station, Ared Trent was to have been its first commander. But, a few months before the Station was ready to be launched, came the historic break between my father and Trent.

That quarrel has puzzled historians. The two had been friends since before my father sent Trent to the Moon. Man of knowledge and man of money, they had seemed to live in a perfect symbiosis. Biographers have suggested, and rightly, I believe, that Trent, although he seemed to have the feelings of a product integrator, actually must have suppressed a deep resentment of my father's assumption of a dictatorial superiority.

But the real key to the quarrel, I think, is the suicide of Nada Vale. The actress had obviously been desperately in love with my father. Absorbed at the time in the expedition to Mars and the conquest of power, he can hardly have cared very much for her. It is certain that they were never married. And it seems that she was bitterly jealous of the woman my father did love.

That woman was lovely Doris Wayne, heir to the Marine Mines billions. My father met her soon after the return from Mars. They were married in 2138. On the wedding night, Nada Vale drank poison in the anteroom of their Manhattan penthouse.

And Ared Trent, although no one had guessed it, cherished an old infatuation for the actress. She had promised years before to marry him, it seems, if he came back alive from the Moon—perhaps only with a professional eye to future publicity. But, before he came back, she met his backer, my father. Trent was forgotten. And he concealed his deep injury until her suicide broke his old restraint.

At any rate, Trent suddenly demanded an equal voice with my father in the direction of the Sun Power Corporation. My father refused, astonished. There was a long legal battle, in which Trent was completely defeated. Then my father, to show some gratitude for his services, made him a free gift of ten million dollars. Trent used it to build a new laboratory isolated in South Africa, and went into complete seclusion.

COMMAND of the Station, meantime, was given to bluff, stocky Tom Cornwall, hero of the Moon. Sitting with my mother in our island villa, I watched the launching of the Station. It was a colossal upright cylinder of massive steel, with curved ends. Incredibly tremendous, it loomed above tiny-seeming tracks and derricks, and the mills and furnaces of the new steel city that had made its metal. The crew had gone aboard. My father, magnificent on the platform, made a speech and shook the hand of Tom Cornwall. The intrepid captain vanished. The cheering multitude—people small and black as crawling insects about the Station—were herded back. Then the steel cylinder flickered curiously, and was lost in a pillar of silver haze—all light reflected



In the guise of a friend, they had been able to slip past the mighty defensive screens of the sun-station.

by its shielding ether fields. The pillar floated upward. A sudden wind swept the throng, raising a little cloud of dust and hats. And the Station was gone to the Sun.

There was rioting, that day, on all the stock exchanges. Coal, oil, and water-power stocks dropped ruinously. SPC soared to dizzy heights. A dozen desperate investors killed themselves. My father boasted that in one day, before any wealth had come from the Sun, he had cleared nearly two billion dollars.

The great relief ship, the *Solarion*, was built that year in the same Ohio yards. I was not ten years old when it came back from its first voyage to the Sun. It brought hundreds of tons of the wondrous blue substance, frozen power, that went on the market at twelve hundred dollars an ounce.

Garth Hammond's star seemed to be shining very brightly. There was hardly a hint of the storm of trouble and disaster that rose with the passing years, to bend his strong shoulders, bleach his hair, ruin SPC, and even to bring all the solar system to the very threshold of disaster.

But gnarled old Zynlid and his three companions from Mars, in their gravity-shielded tank, were already dead of the Falling Sickness.

IV.

THE FRIGHTFUL shadow of the old pandemic suddenly darkened over all the world. For something had happened to the virus: some reaction, physiologists said, of the malignant molecule with the alien proteins in the bodies of the Martians. Old immunities were destroyed. The new, virulent plague swept the planet. In a single year, a hundred million died. All the horrors of the Black Century threatened to return.

Among the natives of Mars the disease was even more deadly than on Earth. When my father's conquering fleet appeared on the red planet, the cities attempted to resist and the Korduv was blown up. It is uncertain whether, as enemies of my father have charged, the Falling Sickness was deliberately spread. But, within a few weeks, it destroyed half the inhabitants of Mars. The planet surrendered. Anak, the old priest-king, was forced into exile. He came to Earth, with his daughter, and established residence in a shabby, century-old building in Washington. His brood-

ing, bitter hatred of my father always grew, and his guarded inner rooms, armored against the gravity and the air of Earth, were an early center of the organized intrigue against Garth Hammond and the SPC.

My father had brought the Martians to Earth. He was to blame, therefore, for the new epidemic. And the Martians hated him doubly, as the desecrator of their solar religion and the murderer of their race.

Agitators made him responsible, too, for the horde of new economic ills that threatened to crush the very life from the planet. The epidemic alone, with its fears, illness, and death, was enough to cause vast depression. Added to that was the financial panic and industrial disturbances occasioned by the destruction of the old power industries and the rise of SPC.

Yet—and an item to my father's credit—industry must have been stimulated vastly by the exploitation of the other planets. After the conquest of Mars, the new space fleets of SPC explored the Moon, Venus, Mercury, and the satellites of Jupiter. The parent corporation proliferated into a thousand subsidiary development, concessions, mineral, planting, transport, even news and amusement enterprises. There was even a Martian Copyright & Patents Corporation, to exploit the arts and sciences of that ancient planet.

SPC was suddenly the most powerful—and soon the most hated—entity on Earth. The yearly production of sunstone from the Station ran above one thousand tons. At the standard price, pegged mercilessly at twelve hundred dollars an ounce, that meant a gross annual revenue in excess of forty billion dollars—enough to make Garth Hammond virtual dictator of the Solar System.

"Trust-busting" legislation was passed by embittered liberal and labor groups—in vain. For national law

ceased at the stratosphere. The only ships in space were those marked SPC, and the only law was that enforced by my father's corporation police, the famous Sun Patrol.

The law, as always, adapted itself to current reality. SPC was recognized as virtually an independent state, with jurisdiction everywhere beyond Earth's stratosphere. And Garth Hammond was its absolute ruler—though legally still a citizen of the United States, granted certain immunities as an "employee" of SPC, his only title being chairman of the board of a corporation chartered in New Jersey.

He was master of the law. The law helped suppress a hundred strikes aimed at SPC. It helped the Sun Patrol to thwart a dozen attempts against his life—in some of which Anak and the fanatical Martian *émigrés* were suspected of being involved.

THE GRAVEST blow against him came from outside the law, and outside the Earth. The *Solarion*, in 2146, returning with her seventh cargo of sunstone, was accosted by a strange vessel in space—a slim red arrow of a ship, unlike the mirror spheres of SPC. Heliographs flashed a message, signed "Redlance," demanding surrender of the ship and cargo, "in the name of liberty and human right." The captain refused to surrender, and escaped after a running fight. Next year the *Solarion* went out again, better armed—and never came back.

When the first attack on the relief ship became known, Anak had let newsmen through the valve into the great steel tank that held a fragment of exiled Mars. His dark-scaled body was now withered and bent, his strange face lined and haggard and terrible with bitterness and hate. Stalking back and forth, like some restless, caged beast, beneath the glowing Sun disk that he had brought from the temple on Mars, he shook a

lean, unearthly arm at them.

"It is the judgment of the Sun," his flat, guttural voice rasped barely intelligible English. "Garth Hammond despoiled the jewel of the Sun. He defiled the sacred places, and stole the holy secret. He spilled the blood of the Sun, slew my Wahneema!" His black, yellow-rimmed eyes glared with fanatical malice. "And he shall know the judgment of the Sun!"

Trembling, then, with a savage wrath, he drove the newsmen out.

It was soon certain, now, that "Redlance" had taken the *Solarion*, for the Earth was flooded with "bootleg" sunstone. And it seemed probable that the pirates, or at least their leaders, must be vengeful Martians, because the secret of the drive field had never been made public on Earth.

Trying to run down the sunstone smugglers, Sun Patrol operatives found evidence that linked the ring with Anak's daughter, Asthore. Grown now, she had become a peculiarly beautiful being, tall and graceful, her fine-scaled skin a nacerous white, her eyes huge and purple beneath a crimson coronal. But her uncanny beauty was quite inhuman, and she shared all her father's hatred of mankind and Garth Hammond.

Sun Patrol men, aided by Federal agents, finally closed in on the old house in Washington, with warrants for Anak and his daughter. But the tank was deserted. The exiles had fled. A planet-wide search failed to discover them.

The fleets of the SPC scoured space for the pirate, searched planets and asteroids for a base, in vain. A second, hurriedly constructed relief ship, the *Solarion II*, was also lost, her wrecked and looted hull being discovered adrift near the orbit of Mercury. The *Solarion III*, in 2148, safely reached the Sun and returned. But her holds were empty and she brought appalling news. The Station itself was lost!

The cause of the disaster could only

be surmised. The great plant might have been captured or destroyed by the pirates. Or, frail as a bubble floating in the flaming ocean of the solar photosphere, it might have been obliterated by the titanic forces of the Sun: cyclonic storms of sunspots, whose tremendous vortices might have dragged it down into a very atomic furnace; super-hurricanes of prominences, blasts of flaming hydrogen flung upward at hundreds of thousands of miles an hour; heat inconceivable, 6000 degrees at the surface, intense enough to destroy the Station in an instant if deflection fields or conversion batteries failed. Or it was possible that mutiny or the Falling Sickness had annihilated the crew.

Whatever its cause, the disaster was crushing. Stocks and bonds of SPC crashed ruinously. My father found it difficult to get capital to begin construction of a new power station, and strikes and sabotage hindered the work.

THE SMUGGLED supplies of sunstone ceased as mysteriously as they had begun. Rusty windmills and turbines turned again. Men groped into abandoned coal mines. Prices rose enormously. Unemployment soared. Farm machines stood idle for want of power. Famine pinched the world—and malnutrition invited a hideous new wave of the Falling Sickness.

And on my father's shoulders fell the blame for all these misfortunes of humanity. I was near him, in those black days—with a court order, when I was twelve, he had taken me from my mother. At first I had been resentful. I had hated his luxurious home, and hated his new wife, Doris, for taking my mother's place. But she had been always kind. I had come to like her. And I couldn't help a vast admiration for my father, now, and a sympathy for him in his sea of troubles.

"It's just about the finish, Chan," he told me wearily, one day, when I had

found him sitting motionless as a black statue at the big desk in his sumptuous office. "It would be four years, or five, before the new station could furnish any revenue—even if the pirates let it be. SPC can't hold out that long."

I tried to encourage him.

"One chance," he admitted. "If I could get Trent. The best mind I ever knew. If he would forget—"

But the search for Trent failed. Years before, with my father's gift, he had built a great laboratory in South Africa. But the isolated buildings had now been for several years abandoned. And Ared Trent was gone without a trace.

Upon that failure came the thrust of sharper disaster. My father's wife, the former Doris Wayne, contracted the Falling Sickness. After two days of agony, clinging to the bed and screaming with that frightful vertigo, she died. It was after that that my father's hair began to turn white. His big shoulders sagged. Turned to a grim machine, he refused to leave the office for rest or sufficient sleep.

Without sunstone, it would soon be impossible to navigate space. Revenues from the mines would stop, and the colonies would have to be abandoned. The interplanetary prestige of SPC was vanishing. Hostile groups passed ruinous restriction and taxation measures.

"Bankruptcy, Chan!" I had gone to the silver tower of SPC, in Manhattan, to try to persuade my father to come home for the week end and rest. He was leaning heavily on the big polished desk, staring down at a dusty blue bottle labeled "Hammond's Lunar Oil."

His eyes looked up at me, hollow, dead. "I've kept this, Chan," he said. "To remind myself that it all began with a little colored water. But I guess I forgot. All this doesn't seem real. Not possible!" He ran a tired hand back through his thick white hair. "But I began by shining boots, Chan. And it looks as if you will, too."

It was then, when his troubles seemed to have reached the last extremity, that the thing came, the stunning revelation, that reduced them all, by comparison, to nothing.

A strange space vessel was seen above New York. It landed on the great Long Island field of SPC. It was a long, sinister bolt of crimson. Its hull bore scars of battle, and it was black-lettered with the name *Redlance*.

The port authorities were in a flurry of fear, but they soon discovered that the pirate designed no harm. A haggard, white-haired man stumbled out of the valve, and wildly demanded to be taken at once to my father.

I WAS IN the office when they met. My father was wearing a white laboratory apron, and his fingers were stained with chemicals. He smiled—and suddenly recklessly invincible as in the old days—and then seized Trent's hand with evident warm emotion.

"Well, Ared! So you are *Redlance*. After all, who else could have done it?" He stepped closer, earnestly. "Can we be friends again? I've made mistakes, Trent, and I'm sorry for them. The SPC is beaten. But now I'm come on something new. If you will help me, together we—"

The lean man had been staring at him with feverish, bloodshot eyes. And Trent's voice rasped suddenly out, hoarse and desperate: "No, Hammond! There's nothing left." He licked his cracked lips. "Forget your schemes, man. We're finished. Done!"

My father quickly caught his arm. "What do you mean?"

"I've been a damned fool, Hammond. Yes, I was the pirate. I hated you, Hammond. Because you wanted too much power. And . . . Nada— But forget all that. I built the ship—in Africa. I gathered a crew of human scum and Martian fanatics. Joined old

Anak's plotters. God help me, Hammond!

"We took your two relief ships. And then, using the first *Solarion* to trick Cornwall, we took the Station. And then Anak, with his Martian devils, and his lovely, lying snake of a daughter, took it from me. I'd no idea what an awful thing they planned—believe me, Hammond!"

My father caught his breath, stiffened, waited.

"You can't understand how desperate they are, how bitter," came Trent's hoarse voice. "The religious outrage, you know. And then the Falling Sickness . . . it would have wiped them out in fifty years, anyhow."

My father gulped.

"My God, Trent!" His voice trembled. "What are you trying to tell me?"

"They're going to load the Station with sunstone." Trent's red, hollow eyes stared unseeingly. "Four thousand tons of pure energy. Then sink it into the photosphere as far as the screens will hold." His dead flat voice had no emphasis, as if his feeling were already killed. "And then blow it up."

Soundlessly, my father's lips whispered, "What then?"

"A new focus of disintegration, like that at the center of the Sun. A wave of matter-annihilating concussion. It will blow out, of course. Rip a hole in the photosphere. Expansion will kill it. Not that that matters."

My father was staring stupidly.

"A minor nova outburst," Trent amplified. "A quite insignificant flash among the stars. The safety mechanism of the Sun will adjust itself. Its radiation, within a week, will be back to normal.

"But that shell of flaming gas will sweep all the planets, out to Jupiter."

"Old Anak!" whispered my father. "What was it he said? 'Judgment of the Sun!'"

And he burst suddenly into a roar of senseless laughter.

V.

ANY OTHER MAN would have been unnerved by Trent's revelation. Even the vague rumors that escaped a hurriedly applied censorship were enough to throw the world into panic. But Garth Hammond, when he had time to recover from the impact, displayed a curious equanimity.

Would it be possible to reach the Sun before the explosion?

"Possible, yes," said Trent. "Possibly the *Redlance* could do it, though she's crippled. I don't know. But why?"

Could any attack hope for success?

Trent shook his haggard head.

"I know the reputation of your Sun Patrol, Hammond," he said. "I know your men would give their lives. And, given time, we could rig part of your fleet with shields for flight into the Sun. But it's no use."

He shrugged hopelessly.

"Don't think of force. The Station is invincible. There's no weapon that could even match the beating it is always getting from the Sun. We tricked Cornwall. We'd never have gotten aboard if he hadn't thought there were friends on the *Solarion*.

"But Anak has no friends."

Well, if they couldn't get aboard, could they get even into telephone contact with the Station?

"Just possible," Trent admitted. "But that means a very close approach, even with a tight cosmo-beam. But what arguments would you use on Anak? What could you promise him, when his very race is doomed? No, Hammond, it's no use," Trent insisted bitterly. "Unless we send a ship or two out beyond Jupiter. So, a few might survive—"

"No, Trent," my father said abruptly.

"We're going to the Sun."

I would gladly have given my right hand to go with the *Redlance*, for it seemed that the expedition would probably be the last and most dramatic event in human history. But my father gruffly told me to go back to mother and wait with her.

Hurt—it is queer how one could nurse an injured private vanity while such great things were at stake—I returned to the marble villa on the Aegean. The wild rumors of doom had reached my mother. She was pathetically glad to see me. She asked many questions about my father, whom she had not seen since I was a tiny child. I knew that she loved him still.

For weary weeks, we waited. A trip by sail, down among the Cyclades, failed to ease the suspense. My mother fell ill with the strain—and I feared, for a dreadful hour, that she was a victim of the Falling Sickness, then raging through the islands.

No word came back from the *Redlance*. But fevered imagination pictured the details of the desperate voyage. The battered red hull shielded in the silver fog of deflection fields. The plunge into the Sun's fiery ocean. The frightful dive in quest of the Station, menaced with an intensity of heat beyond conception, battered with incredible storms, crushed with the pressure of a gravitation twenty-eight times that of Earth.

It was a period of sunspot maxima. Magnetic storms disturbed communication. One night was splendid with the cold flames of the aurora. I remember looking at the Sun through a dark glass, its round face pocked with a dozen angry vortices, each large enough to swallow an Earth. Dazzled, I went back to my mother, shuddering. If the power of the Sun could do all these things across 93,000,000 miles, what could it not do to men in its very flaming grasp?

To quiet the rumors, desperate offi-

cial had finally announced the truth. Depression and despair ruled the Earth. As if it fed on fear, a fresh epidemic spread, until it seemed that the Falling Sickness raced with astronomical cataclysm to wipe out mankind.

Then, to a stunned and incredulous planet, came the brief heliographic dispatch picked up and relayed from the colony on the Moon:

TO EARTH:

DANGER ENDED. ANAK SURRENDERED STATION INTACT. SPC RECOGNIZES INDEPENDENCE OF MARS. ANAK WILL BE RESTORED. STATION BACK IN OPERATION. REDLANCE BRINGING SUNSTONE TO EARTH.

GARTH HAMMOND

THAT WAS too good to believe. Many of use refused to believe it—until the *Redlance* landed on Long Island, thirty hours later. Trent left my father and two thousand tons of sunstone, and went on to carry Anak back to Mars.

But why had Anak, so grimly bent upon revenge—why had he surrendered?

My father himself brought the answer to that. His private stratoplane landed unwarned in the lee of our island, and taxied shoreward. Garth Hammond leaped out and waded up the beach. The ruggedly handsome face beneath his thick white hair was smiling gayly as ever, but his gray eyes held a wistful tenderness that I had never seen.

I ran to meet him, shouting incoherent questions.

"Run this." He thrust a visivox spool into my hand. "Where's your mother, Chan?"

I pointed, wondering briefly at the husky catch in his voice, and then ran to put the spool on a machine. The bright screen showed the *Redlance* land-

ing, and then my father speaking to the tremendous crowd on the field in his old grand manner.

"You wonder, perhaps, why Anak gave up his frightful plan and surrendered?"

He paused for silence and effect.

"It is because I traded him something. For the Station, I traded him life. And the life of his race. The life of Mars! And I bring the same boon, a free gift to you and to all the Earth."

Another dramatic halt.

"I have conquered the Falling Sickness." There was a sound like a sob from all that multitude. A burst of clapping, quickly hushed. A breathless quiet. "It was the cure for that disease that I gave Anak and his men. And that I give the Earth."

There was an utter, queerly painful stillness. A great choking lump rose in my own throat. My father, on that tiny screen, made an oddly diffident little smile.

"I mean it," he said. "Free clinics will be opened at once by the Hammond Foundation. A harmless chemical renders the body proteins insensitive to the virus. Immunization is complete. There will be no more Falling Sickness!"

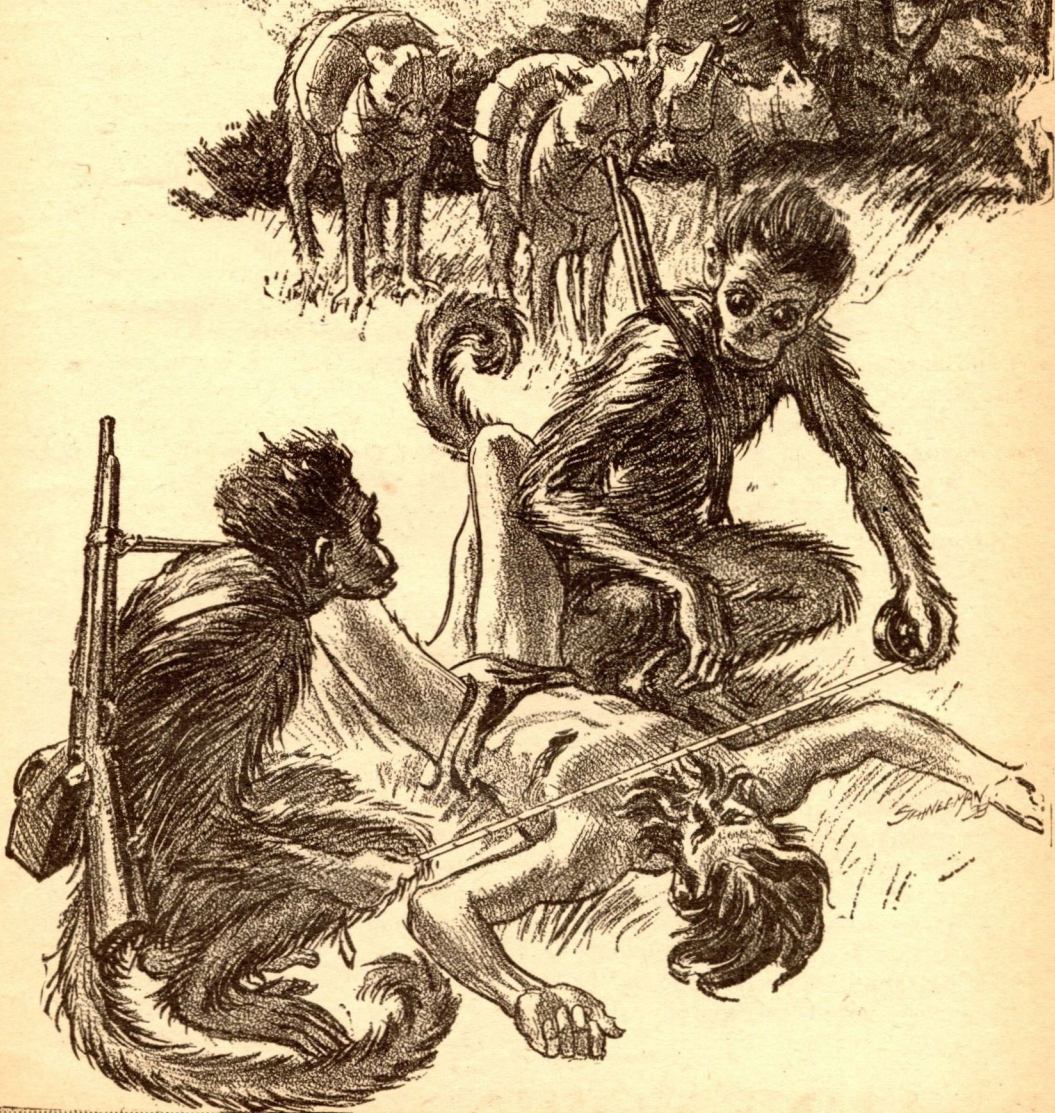
I found my father and my mother sitting side by side in her quiet, fragrant room. Her face was stained with tears, and her smile was very happy. My father had been telling her what I had learned from the spool. His great laugh boomed out softly.

"Funny thing!" he told her. "That chemical was formed in an old bottle of the Lunar Oil. The cheap, impure stuff we used at the last. I happened to hold it against the light, and saw the change in color. When I analyzed it—"

I turned back, silently, and left them alone.

Read UNKNOWN out Feb. 10

LIVING FOSSIL



BY L. SPRAGUE DE CAMP

LIVING FOSSIL

A conservationist from South America saves a living fossil of a vanished age—Man!

WHERE the rivers flowed together, the country was flat and, in places, swampy. The combined waters spread out and crawled around reedy islands. Back from the banks, the ground rose into low tree-crowned humps.

The May flies were swarming that day, and as thousands of them danced, the low afternoon sun, whose setting would bring death to them all, glinted on their wings. There was little sound, other than the hum of a belated cicada and the splashing of an elephantlike beast in the southern tributary.

The beast suddenly raised its head, its great mulish ears swiveling forward and its upraised trunk turning this way and that like a periscope. It evidently disapproved of what it smelled, for it heaved its bulk out of its bath and ambled off up a creek bed, the feet on its columnar legs making loud sucking noises as they pulled out of the mud.

Two riders appeared from downstream, each leading an animal similar to the one he rode. The animals' feet swished through the laurel beds and went *squilch-squilch* as they struck patches of muck. As they crossed the creek bed, the leading rider pulled up his mount and pointed to the tracks made by the elephantine beast.

"Giant tapir!" he said in his own harsh, chattering language. "A big one. What a specimen he'd make!"

"*Ngoy?*" drawled his companion, meaning approximately "Oh, yeah?" He continued: "And how would we get it back to South America? Carry it slung from a pole?"

The first rider made the grating noise in his throat that was his race's equiva-

lent of laughter. "I didn't suggest shooting it. I just said it would make a good specimen. We'll have to get one some day. The museum hasn't a decent mounted example of the species."

The riders were anthropoid, but not human. Their large prehensile tails, rolled up behind them on the saddle, and the thick coats of brown and black hair that covered them, precluded that. Their thumblike halluces or big toes jutted out from the mid-portion of their feet and were hooked into the stirrups, which were about the size and shape of napkin rings. Below the large liquid eyes in their prognathous faces there were no external noses, just a pair of narrow nostrils set wide apart. The riders weight about one hundred and fifty pounds each. A zoölogist of today would have placed them in the family *Cebidæ*, the capuchin monkeys, and been right. They would have had more difficulty in classifying the zoölogist, because in their time the science of paleontology was young, and the family tree of the primates had not been worked out fully.

Their mounts were the size of mules; tailless, round-eared, and with catlike whiskers sprouting from their deep muzzles. They absurdly resembled colossal guinea pigs, which they were; or rather, they were colossal agoutis, the ordinary agouti being a rabbit-sized member of the cavy family.

THE LEADING rider whistled. His mount and the led pack agouti bucked up the creek bank and headed at their tireless trot toward one of the mounds. The rider dismounted and began poking around between the curiously regular

granite blocks scattered among the green-and-brown-spotted trunks of the sycamores. Grasshoppers exploded from under his feet as he walked.

He called, "Chujee!"

The other rider trotted up and got off. The four agoutis went to work with their great chisel teeth on the low-drooping branches.

"Look," the first rider said, turning over one of the blocks. "Those faces are too nearly parallel to have been made that way by accident. And here's one with two plane surfaces at a perfect right angle. I think we've found it."

"Ngoy?" drawled the other. "You mean the site of a large city of Men? Maybe." Skepticism was patent in his tone as he strolled about, poking at the stones with his foot. Then his voice rose. "Nawputta! You think *you've* found something; look at this!" He uprighted a large stone. Its flat face was nearly smooth, but when it was turned so that the sun's rays were almost parallel with the face, a set of curiously regular shadows sprang out on the surface.

Nawputta—he had a given name as well, but it was both unpronounceable and unnecessary to reproduce, here—scowled at it, trying in his mind to straighten the faint indentations into a series of inscribed characters. He fished a camera out of his harness and snapped several pictures, while Chujee braced the stone. The markings were as follows:

NATIO
ANK OF
TTSBURGH

"It's an inscription, all right," Nawputta remarked, as he put his camera away. "Most of it's weathered away, which isn't surprising, considering that the stone's been here for five or ten million years, or however long Man has been extinct. The redness of this sand bears out the theory. It's probably full

of iron oxide. Men must have used an incredible amount of steel in their build-ings."

Chujee asked: "Have you any idea what the inscription says?" In his voice there was the trace of awe which the capuchins felt toward these predecessors who had risen so high and vanished so utterly.

"No. Some of our specialists will have to try to decipher it from my photographs. That'll be possible only if it's in one of the languages of Man that have been worked out. He had dozens of different languages that we know of, and probably hundreds that we don't. The commonest was En-gel-iss-ha, which we can translate fairly well. It's too bad there aren't some live Men running around. They could answer a lot of questions that puzzle us."

"Maybe," said Chujee. "And maybe it's just as well there aren't. They might have killed *us* off if they'd thought we were going to become civilized enough to compete with them."

"Perhaps you're right. I never thought of that. I wish we could take the stone back with us."

Chujee grunted. "When you hired me to guide you, you told me the museum just wanted you to make a short reconnaissance. And every day you see something weighing a ton or so that you want to collect. Yesterday it was that bear we saw on the cliff; it weighed a ton and a half at least."

"But," expostulated Nawputta, "that was a new subspecies!"

"Sure," growled the guide. "That makes it different. New subspecies aren't really heavy; they only look that way. You scientific guys! We should have brought along a derrick, a steam tractor, and a gang of laborers from the Colony." His grin took the sting out of his words. "Well, old-timer, I see you'll be puttering around after relics all day; I might as well set up camp."

He collected the agoutis and went off to find a dry spot near the river.

PRESENTLY he was back. "I found a place," he said. "But we aren't the first ones. There's the remains of a recent fire."

Nawputta, the zoölogist, looked disappointed. "Then we aren't the first to penetrate this far into the Eastern Forest. Who do you suppose it was?"

"Dunno. Maybe a timber scout from the Colony. They're trying to build up a lumber export business, you know. They don't like being too dependent on their salt and sulphur— Yeow!" Chujee jumped three feet straight up. "Snake!"

Nawputta jumped, too; then laughed at their timidity. He bent over and snatched up the little reptile as it slithered among the stones. "It's perfectly harmless," he said. "Most of them are, this far north."

"I don't care if it is," barked Chujee, backing up rapidly. "You keep that damn thing away from me!"

NEXT DAY they pushed up the south tributary. The character of the vegetation slowly changed as they climbed. A few miles up, they came to another fork. They had to swim the main stream in order to follow the smaller one, as Nawputta wished to cast toward the line of hills becoming visible in the east, before turning back. As they swam their agoutis across the main street, a black-bellied cloud that had crept up behind them suddenly opened with a crash of thunder, and pelting rain whipped the surface to froth.

As they climbed out on the far bank, Nawputta began absent-mindedly unrolling his cape. He almost had it on when a whoop from Chujee reminded him that he was thoroughly soaked already. The rain had slackened to a drizzle and presently ceased.

The scientist sniffed. "Wood smoke," he said.

Chujee grunted. "Either that's our mysterious friend, or we're just in time to stop a forest fire, if the rain hasn't done that for us." He kicked his mount forward. In the patch of pine they were traversing, the agoutis' feet made no sound on the carpet of needles. Thus they came upon the fire and the capuchin who was roasting a slab of venison over it before the latter saw them.

At the snap of a twig, the stranger whirled and snatched up a heavy rifle.

"Well?" he said in a flat voice. "Who be you?" In his cape, which he was still wearing after the rain, he looked like a caricature of Little Red Riding-hood.

The explorers automatically reached for the rifles in their saddle boots, but thought better of it in the face of that unwavering muzzle. Nawputta identified himself and the guide.

The stranger relaxed. "Oh! Just another one of those damn bug hunters. Sorry I scared you. Make yourselves at home. I'm Nguchoy tsu Chaw, timber scout for the Colony. We—I—came up in that canoe yonder. Made it ourselves out of birch bark. Great stuff, birch bark."

"We?" echoed Nawputta.

The scout's shoulders drooped sadly. "Just finished burying my partner. Rattlesnake got him. Name was Jawga; Jawga tsu Shrr. Best partner a scout ever had. Say, could you let me have some flea powder? I'm all out."

As he rubbed the powder into his fur, he continued: "We'd just found the biggest stand of pine you ever saw. This river cuts through a notch in the ridge about thirty miles up. Beyond that it's gorges and rapids for miles, and beyond that it cuts through another ridge and breaks up into little creeks. We had to tie the boat up and hike. Great country; deer, bear, giant rabbit, duck, and all kinds of game. Not so

thick as they say it is on the western plains, but you can shoot your meat easy." He went on to say that he was making a cast up the main stream before returning to the Colony with his news.

After Nguchoy had departed early the following morning, Chujee, the guide, scratched his head. "Guess I must have picked up some fleas from our friend. Wonder why he held a gun on us until he found who we were? That's no way to treat a stranger."

Nawputta wiggled his thumbs, the capuchin equivalent of a shrug. "He was afraid at being alone, I imagine."

Chujee still frowned. "I can understand his grabbing it before he knew what was behind him; we might have been a lion. But he kept pointing it after he saw we were *Jmu*"—the capuchin word for "human"—"like himself. There aren't any criminals around here for him to be scared of. Oh, well, I guess I'm just naturally mistrustful of these damned Colonials. Do you want to look at this 'great country'?"

"Yes," said Nawputta. "If we go on another week, we can still get out before the cold weather begins." (Despite their fur, the capuchins were sensitive to cold, for which reason exploration had lagged behind the other elements of their civilization.) "Nguchoy's description agrees with what Chmrrgoy saw from his balloon, though, as you recall, he never got up this far on foot. He landed by the river forty miles down and floated down the Big Muddy to the Colony on a raft."

"Say," said Chujee. "Do you suppose they'll ever get a flying machine that'll go where you want it to, instead of being blown around like these balloons? You know all about these scientific things."

"Not unless they can get a much lighter engine. By the time you've loaded your boiler, your engine proper, and your fuel and feed water aboard,

your flying machine has as much chance of taking off as a granite boulder. There's a theory that Men had flying machines, but the evidence isn't conclusive. They may have had engines powered by mineral oils, which they pumped out of beds of oil-bearing sand. Our geologists have traced some of their borings. They used up nearly all the oils, so *we* have to be satisfied with coal."

IT WAS a great country, the explorers agreed when they reached it. The way there had not been easy. Miles before they reached the notch, they had had to cut their way through a forest of alders that stretched along the sides of the river. Chujee had gone ahead on foot, swinging an ax in time to his strides with the effortless skill of an old woodsman. With each swing the steel bit clear through the soft white wood of a slim trunk. Behind him, Nawputta had stumbled, the leading agouti's reins gripped in his tail.

When they had passed through the notch, they climbed up the south side of the gorge in which they found themselves and in the distance saw another vast blue rampart, like the one they had just cut through, stretching away to the northeast. (This had once been called the Allegheny Mountains.) Age-old white pines raised their somber blue-green spires above them. A huge buffalo-shaped cervid, who was rubbing the velvet from his antlers against a tree trunk, smelled them, snorted, and lumbered off.

"What's that noise?" asked Nawputta.

They listened, and heard a faint rhythmical thumping that seemed to come out of the ground.

"Dunno," said Chujee. "Tree trunks knocking together, maybe? But there isn't enough wind."

"Perhaps it's stones in a pothole in the river," said Nawputta without conviction.

They kept on to where the gorge widened out. Nawputta suddenly pulled his agouti off the game trail and jumped down. Chujee rode over and found the scientist examining a pile of bones.

Ten minutes later he was still turning the bones over.

"Well," said Chujee impatiently, "aren't you going to let me in on the secret?"

"Sorry. I didn't believe my own senses at first. These are the bones of Men! Not fossils; *fresh* bones! From the looks of them they're the remains of a meal. There were three of them. From the holes in the skulls I'd say that our friend Nguchoy or his partner shot them. I'm going to get a whole specimen, if it's the last thing I do."

Chujee sighed. "For a fellow who claims he hates to kill things, you're the bloodthirstiest cuss I ever saw when you hear about a new species."

"You don't understand, Chujee," objected Nawputta. "I'm what's called a fanatical conservationist. Hunting for fun not only doesn't amuse me; it makes me angry when I hear about it. But securing a scientific specimen is different."

"Oh," said Chujee.

THEY PEERED out of the spruce thicket at the Man. He was a strange object to them, almost hairless, so that the scars in his yellow-brown skin showed. He carried a wooden club, and padded noiselessly over the pine needles, pausing to sniff the air. The sun glinted on the wiry bronze hair that sprouted from his chin.

Nawputta squeezed his trigger; the rifle went off with a deafening *ka-pow!* A fainter *ka-pow!* bounced back from the far wall of the gorge as the Man's body struck the ground.

"Beautiful!" cried Chujee. "Right through the heart! Couldn't have done better myself. But I'd feel funny about shooting one; they look so *Imu.*"

Nawputta, getting out his camera, tape measure, notebook, and skinning knife, said: "In the cause of science I don't mind. Besides, I couldn't trust you not to try for a brain shot and ruin the skull."

Hours later he was still dissecting his prize and making sketches. Chujee had long since finished the job of salting the hide, and was lolling about trying to pick up a single pine needle with his tail.

"Yeah," he said, "I know it's a crime that we haven't got a tank of formaldehyde so we could pack the whole carcass back, instead of just the skin and skeleton. But we haven't got it, and never did have it, so why bellyache?"

Much as he respected Nawputta, the zoölogist got on his nerves at times. Not that he didn't appreciate the scientific point of view; he was well-read and had some standing as an amateur naturalist. But, having managed expeditions for years, he had long been resigned to the fact that you can carry only so much equipment at a time.

He sat up suddenly with a warning "S-s-st!" Fifty feet away a human face peered out of a patch of brake ferns. He reached stealthily for his rifle; the face vanished. The hair on Chujee's neck and scalp rose. He had never seen such a concentration of malevolent hatred in one countenance. The ferns moved, and there was a brief flash of yellow-brown skin among the trees.

"Better hurry," he said. "The things may be dangerous when one of 'em's been killed."

Nawputta murmured vaguely that he'd have the skeleton cleaned in a few minutes. He was normally no more insensitive to danger than the guide, but in the presence of this scientific wonder, a complete Man, the rest of the world had withdrawn itself into a small section of his mind.

Chujee, still peering into the forest, growled: "It's funny that Nguchoy

didn't say anything to us about the Men. That is, unless he *wanted* us to be eaten by the things. And why should he want that? Say, isn't that pounding louder? I'll bet it's a Man pounding a hollow log for a signal. If Nguchoy wanted to get rid of us, he picked an ingenious method. He and his partner kill some of the Men, and we come along just when they've got nicely stirred up and are out for *Jmu* blood. Let's get out of here!"

Newputta was finished at last. They packed the skin and skeleton of the Man, mounted, and rode back the way they had come, glancing nervously into the shadows around them. The pounding was louder.

They had gone a couple of miles and were beginning to relax, when something soared over their heads and buried itself quivering in the ground. It was a crude wooden spear. Chujee fired his rifle into the underbrush in the direction from which the spear had come. A faint rustle mocked him. The pounding continued.

The notch loomed high before them, though still several miles away. The timber was smaller here, and there was more brush. They had originally come along the river, and followed game trails up the side of the gorge at this point. They hesitated whether or not to go back the same way.

"I don't like to let them get above me," complained Nawputta.

"We'll have to," argued Chujee. "The sides of the notch are too craggy; we'd never get the agoutis over it."

They started down the slope, on which the trees thinned out. A chorus of yells brought them up sharply. The hairless things were pouring out of the deep woods and racing toward them.

"The agoutis won't make it with those loads," snapped Chujee, and he flung himself off his mount.

Nawputta did likewise, and his rifle crashed almost as soon as the guide's.

The echoes of their rapid fire made a deafening uproar in the gorge. Nawputta, as he fired and worked the lever of his gun, wondered what he'd do when the magazine was empty.

Then the Men were bounding back into the shelter of the woods, shrieking with fear. They vanished. Two of their number lay still, and a third thrashed about in a raspberry bush and screeched.

"I can't see him suffer," said Nawputta. He drew a bead on the Man's head and fired. The Man quieted, but from the depths of the forest came screams of rage.

Chujee said dryly, "They didn't interpret that as an act of mercy," as he remounted.

The agoutis were trembling. Nawputta noticed that he was shaking a bit himself. He had counted his shots, and knew before he started to reload that he had had just one shot left.

The yelping cries of the Men followed them as they headed into the notch, but the things didn't show themselves long enough for a shot.

"That was too close for comfort," said Nawputta in a low voice, not taking his eyes from the woods. "Say, hasn't somebody invented a rifle whose recoil automatically reloads it, so that one can shoot it as fast as one pulls the trigger?"

Chujee grunted. "Yeah, he was up in the Colony demonstrating it last year. I tried it out. It jammed regularly every other shot. Maybe they'll be practical some day, but for the present I'll stick to the good old lever action. I suppose you were thinking of what would have happened to us if the Men had kept on coming. I— Say, look!" He halted his animal. "Look up yonder!"

Nawputta looked, and said: "Those boulders weren't piled up on top of the cliff when we came this way, were they?"

"That's right. When we get into the narrowest part of the notch, they'll roll them down on us. They'll be protected from our guns by the bulge of the cliff. There's no pathway on the other side of the river. We can't swim the animals because of the rapids, and even if we could, the river's so narrow that the rocks would bounce and hit us anyway."

Nawputta pondered. "We'll have to get through that bottle neck somehow; it'll be dark in a couple of hours."

Both were silent for a while.

Chujee said: "There's something wrong about this whole business; Nguchoy and his partner, I mean. If we ever got out of this—"

Nawputta interrupted him: "Look! I could swim one agouti over here, and climb a tree on the other side. I could get a good view of the top of the cliffs. There's quite an open space there, and I could try to keep the Men away from the boulders with my gun, while you took the agoutis down through the notch. Then, if you can find a corresponding tree below the bottle neck, you could repeat the process while I followed you down."

"Right! I'll fire three shots when I'm ready for you."

Nawputta tethered his animal and hoisted himself up the big pine, his rifle held firmly in his tail. He found a place where he could rest the gun on a branch to sight, and waved to the guide, who set off at a trot down the narrow shelf along the churning waters.

Sure enough, the Men presently appeared on top of the cliff. They looked smaller over the sights of Nawputta's rifle than he had expected; too small to make practical targets as individuals even. He aimed into the thick of these dancing pink midges and fired twice. The crash of the rifle was flung back sharply from the south wall of the gorge. He couldn't see whether he had hit any-

thing, but the spidery things disappeared.

Then he waited. The sun had long since disappeared behind the ridge, but a few slanting rays poked through the notch; insects were briefly visible as motes of light as they flew through these rays. Overhead a string of geese flapped southward.

When Nawputta heard three shots, he descended, swam his agouti back across the river, and headed downstream. The dark walls of the gorge towered almost vertically over him. Above the roar of the rapids he heard a shot, then another. The agouti flinched at the reporters, but kept on. The shots continued. The Men were evidently determined not to be balked of their prey this time. Nawputta counted—seven—eight. The firing ceased, and the zoologist knew that his companion was reloading.

There was a rattle of loose rock. A boulder appeared over his head, swelled like a balloon, swished past him, and went *plunk* in the river beside him, throwing spray over him and his mount. He kicked the animal frantically and it bounded forward, nearly pitching its rider into the river at a turn.

Nawputta wondered desperately why Chujee hadn't begun shooting again. He looked up, and saw that the air over his head seemed to be full of boulders hanging suspended. They grew as he watched, and every one seemed headed straight for him. He bent low and urged the animal; he saw black water under him as the agouti cleared a recess in the trail with a bucking jump. He thought: "Why doesn't he shoot? But it's too late now."

The avalanche of rock struck the trail and the river behind him with a roar; one rock passed him so closely that he felt its wind. The agouti in its terror almost skidded off the trail. Then they were out in the sunlight again, and the animal's zigzag leaps settled into a smooth gallop.

Nawputta pulled up opposite Chujee's tree.

The guide was already climbing down with his rifle in his tail. He called: "Did you get hit? I thought you were a goner sure when the rock fall commenced. Got a twig caught in my breech while I was reloading."

Nawputta tried to call back reassurance, but found he couldn't make a sound.

When Chujee pulled his dripping mount up the bank, he got out his binoculars and looked at the south shoulder of the notch. He said: "Come on! They're already climbed down toward us; they haven't given up yet. But I think we can lose them if we can find that trail we cut through the alders. They don't know about it yet, and they'll probably scatter trying to find which way we've gone."

NAWPUTTA yawned, stretched, and sat up. Chujee was sitting by the fire at Nguchoy's camp, his rifle in his lap. Both still looked a trifle haggard after their sleepless flight down the river. They had strung the four agoutis in a column, and taken turns riding backward on the last one of the string to keep watch against another attack. But though the pounding had continued, the Men had not shown themselves again. When they arrived at Nguchoy's camp, the timber scout was not to be seen, evidently not having returned.

Chujee said: "I've been thinking, while you were catching up on sleep, about this Nguchoy and his yarns. I don't reckon he intended us to return, though we couldn't prove anything against him.

"And I wonder how it happened that his partner died at such a convenient time . . . for him. He needed this Jawga person to help him paddle up the rivers. But once they got to the head of navigation, Nguchoy could get back downstream easy enough without

help. And when they'd found that great pine forest, it would be mighty convenient if an accident happened to Jawga. When Nguchoy went back to the Colony, he wouldn't have to share the credit for the find, and the bonus, with anybody.

Nawputta raised his eyebrows, and without a word began hunting in their duffel for a spade.

In half an hour they had dug up all that was mortal of Jawga tsu Shrr. Nawputta examined the remains, which were in a most unpleasant state of decay.

"See!" he said. "Two holes in the skull, which weren't made by any rattlesnake. The one on the left side is just about right for a No. 14 rifle bullet going in."

They were silent. Over the swish of the wind in the trees came a faint rhythmic pounding.

"Do we want to pinch him?" asked Chujee. "It's a long way back to the Colony."

Nawputta thought. "I have a better idea. We'll rebury the corpse for the present."

"Nothing illegal," said Chujee firmly.

"N-no, not exactly. It's this way. Have you ever seen a Colony lumberjack gang in action?"

Nawputta shoved the corpse into the grave. The pounding was louder. Both capuchins looked to see that their rifles were within easy reach.

A tuneless whistling came through the trees.

"Quick!" whispered Nawputta. "Sprinkle some leaves on the grave. When he arrives, you get his attention. Talk about anything."

The whistling stopped, and presently the timber scout appeared. If he was surprised to see the explorers, he did not show it.

"Hello," he said. "Have a good trip?"

He paused and sniffed the air. The explorers realized that there had been one thing they couldn't put back in the

grave. Nguchoy looked at the grave, but made no remark.

"Sure, we did," said Chujee in his best good-fellow manner, and went on to talk about the splendor of the gorge and the magnificence of the pines.

The pounding was becoming louder, but nobody seemed to notice.

"Nguchoy," said Nawputta suddenly, "did you and Jawa see any traces of live Men in the forest?"

The timber scout snorted. "Don't be a sap. Men have been—what's that word?—extinct for millions of years. How could we see them?"

"Well," the scientist went on, "we did." He paused. The only sound was the pounding. Or were there faint yelping cries? "Moreover, we've just had a look at the remains of your late-lamented partner."

There was silence again, except for the ominous sounds of the approach of Men.

"Are you going to talk to us?" asked Nawputta.

Nguchoy grinned. "Sure, I'll talk to you." He sprang back to the tree against which he had left his rifle standing. "With this!" He snatched up the weapon and pulled the trigger.

The rifle gave out a metallic click.

Nawputta opened his fist, showing a handful of cartridges. Then he calmly picked up his own rifle and covered the timber scout.

"Chujee," he said, "you take his knife and hatchet and the rest of his ammunition."

The guide, dumfounded by the decisive way of his usually impractical companion, obeyed.

"Now," said Nawputta, "tie the four agoutis together, and hitch the leading one to the end of Nguchoy's canoe. We're pulling out.

"But what?" asked Chujee uncertainly.

Nawputta snapped: "I'll explain later. Hurry."

As the explorers piled into the boat, the timber scout woke to life.

"Hey!" he shouted. "Aren't you taking me along? The Men'll be here any minute, and they'll eat me! They even eat their own kind when one's been killed!"

"No," said Nawputta, "we aren't taking you."

The canoe pulled out into the river, the agoutis following unwillingly till only their heads and loads showed above water.

"Hey!" screamed Nguchoy. "Come back! I'll confess!"

The canoe kept on, the agoutis swimming in its wake.

As the site of the camp receded, there was a sudden commotion among the trees. The now-familiar yells of the Men were mingled with despairing shrieks from the timber scout. The shrieks ceased, and the voices of the Men were raised in a rhythmical but tuneless chant, which the explorers could hear long after the camp was hidden from view.

CHUJEE, paddling bow, stared straight before him for a while in silence. Finally he turned around in his seat and said deliberately: "That's the lowest damned trick I ever saw in my life. To leave him there defenseless like that to be eaten by those hairless things. I don't care if he *was* a liar and a murderer."

Nawputta's expression of smugness vanished, and he looked slightly crestfallen. "You don't approve, do you? I was afraid you wouldn't. But I had to do it that way."

"Well, why?"

Nawputta took a long breath and rested his paddle. "I started to explain before, but I didn't have time. Nguchoy had killed his partner, and was going to return to the Colony with the

news of the forest. He tried to have us killed by the Men, and when that didn't work, he'd have killed us himself if I hadn't emptied his gun behind his back.

"When he got back to the Colony, a timber gang would have been sent out. They'd have wiped out that forest in a few years, and you'll admit that it's probably the finest in the whole Eastern Mountain area. Moreover, they'd have killed off the wild life, including the Men, partly for food, partly for self-protection, and partly because they like to shoot.

"We thought Man had been extinct for millions of years, after having spread all over the world and reached a state of civilization as high as or higher than ours. The Men that we saw may well be the last of their species. You're a practical fellow, and I don't know whether I can make you understand a biologist's feeling toward a living fossil like that. To us it's simply priceless, and there's nothing we won't do to preserve it.

"If we can get back to South America before the news of the pine stand reaches the Colony, I can pull the necessary wires to have the area set aside as a park or preserve. The Colony can just as well go elsewhere for its lumber. But if the Colony hears about it first, I shan't have a chance.

"If we'd taken Nguchoy back with us, even if we'd brought him to justice, he'd still have been able to give the news away, especially since he could probably have purchased leniency by it. And that would be the end of my park idea.

"If we'd taken the law into our own hands, even if I'd been able to overcome your objections to doing so, we'd have been in a fix when, as will inevitably happen, the Colony sends an officer up to investigate the disappearance of their scout. If we said he died

of a snake bite, for instance, and the officer found a body with a bullet hole through the head, or alternatively if he'd found no body at all, he'd have been suspicious. As it is, we can truthfully say, when they ask us, that Nguchoy was alive and sound of wind and limb the last time we saw him. The officer will then find the remains, having obviously been eaten by the Men. Of course, we needn't volunteer any information until the park proposal is in the bag.

"The reason I took his canoe is that I remembered that Men probably can't swim. At least, the chimpanzee, which is the nearest living relative of Man, can't, whereas we can swim instinctively as soon as we're able to walk.

"But there's a bigger issue than Nguchoy and the Men. You probably think I'm a bit cracked, with my concern for conservation.

"We know that Man, during the period of his civilization, was prodigally wasteful of his resources. The exhaustion of the mineral oils is an example. And the world-wide extinction of the larger mammals at the close of the last ice age was probably his doing, at least in part. We're sure that he was responsible for wiping out all the larger species of whales, and we suspect that he also killed off all but two of the twenty or more species of elephant that abounded at that time. Most of the large mammals of today have evolved in the last few million years from forms that were small enough to sit in your hand in Man's time.

"We don't know just why he became extinct, or almost extinct. Perhaps a combination of war and disease did it. Perhaps the exhaustion of his resources had a share. You know what a hard-boiled materialist I am in most things; but it always has seemed to me that it was a case of outraged nature taking its revenge. That's not rational, but

it's the way I feel. And I've dedicated my life to seeing that we don't make the same mistake.

"Now do you see why I had to do what I did?"

Chujee was silent for a moment, then said: "Perhaps I do. I won't say I approve . . . yet. But I'll think it over for a few days. Say, we'll have to land soon; the agoutis are getting all tired out from swimming."

The canoe slid on down the river in

the Indian-summer sunshine. The white men who had applied the name "Indian summer" to that part of the year were gone, as were the Indians after whom it had been named. Of mighty Man, the only remnant was a little savage tribe in the Alleghenies. A representative of a much more ancient order, a dragonfly, hovered over the bow, its four glassy wings glittering in the sunlight. Then with a faint whir it wheeled and fled.

BLIZZARD ON SATURN

WHEN the worlds were young, and Saturn a new, hot, planet, it snowed there—because it was *too hot to rain*. Recent astrophysical work, correlated with physical studies in Earth laboratories, shows that, in all probability, it never has, and never will rain on Saturn—but it has snowed.

When Saturn was young, new-formed, it was cooling from the near-million-degree temperature of the fresh-formed mass. As it cooled, compounds stable at high temperatures formed first, and among these was hydrogen oxide—but not water. It was a white-hot gas, less closely related to water than our air to the liquid form. Saturn's mighty atmosphere, tens of thousands of miles deep, was exerting frightful pressures, pressure that increased as it cooled slowly. Eventually, it cooled below red heat, till it was black-hot, at about 400°C. At this temperature, water cannot condense; only below 360° can the liquid form exist, no matter how great the pressure.

But recent work under the highest pressures Man can attain, done at the Harvard laboratories, has shown that there is a form of ice which is stable at high temperatures. Even under pressures available in the laboratory—tens of thousands of times atmospheric pressure—this modification of ice is stable far above the boiling point of water. There is reason to believe that the solid form of hydrogen oxide is stable at *higher* temperatures than the liquid form can reach.

Thus, as Saturn cooled, scalding hot snow fell on the black-hot rocks that formed the planet's core. Mile after mile of the unending blizzard swirled down in blinding clouds of superheated snow crystals. Slow ages built it up, till a glacier of unimaginable depth formed about the planet. No puny two-mile scum of ice, but a vast blanket so deep the entire Earth could have been buried beneath it, and, if the planet Venus fell on top, it, too, would have vanished under that blizzard fall.

Fifteen thousand miles of solid, superheated ice!

Arthur McCann



TRADE

BE KIND!



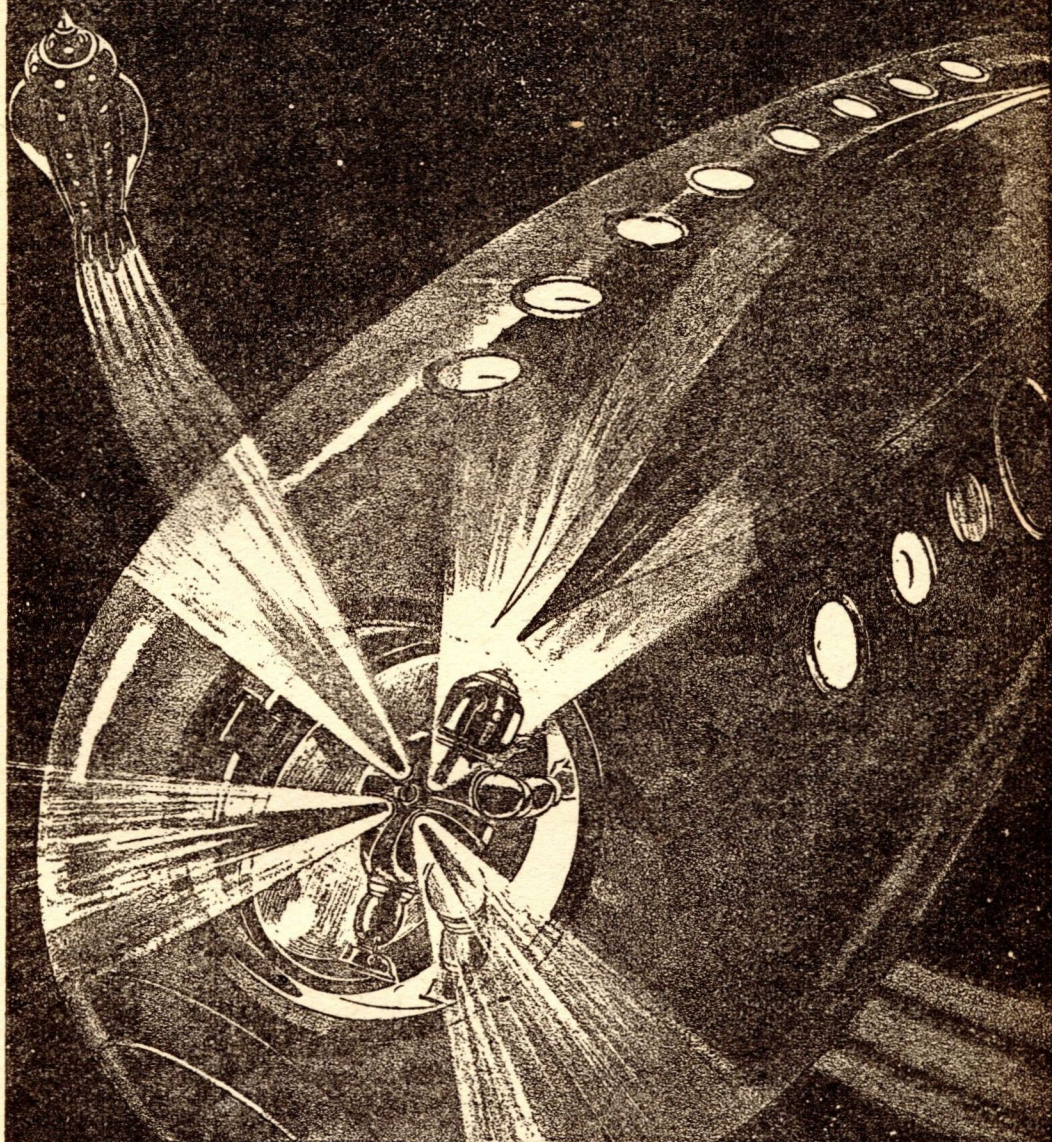
MARK

Be considerate! Don't cough in public places. Carry with you Smith Brothers Cough Drops. (Two kinds—Black or Menthol, 5¢.)

Smith Bros. Cough Drops are the only drops containing VITAMINA

This is the vitamin that raises the resistance of the mucous membranes of the nose and throat to cold infections.

COSMIC ENGINEERS



BY CLIFFORD D. SIMAK

COSMIC ENGINEERS

Beginning a three-part serial of mighty science facing the vastest forces of space and time— out at the end of space itself!

HERB HARPER snapped on the radio and a voice snarled, billions of miles away: "Police ship 968. Keep watch for freighter *Vulcan* on the Earth-Venus run. Search ship for drugs. Believed to be—"

Herb spun the dial. A lazy voice floated through the ship: "Pleasure yacht, *Helen*, three hours out of Sandebar. Have you any messages for us?"

He spun the dial again. The voice of Tim Donovan, radio's ace newscaster, rasped: "Tommy Evans will have to wait a few more days before attempting his flight to Alpha Centauri. The Solar Commerce Commission claims to have found some faults in the construction of his new generators, but Tommy still insists those generators will shoot him along at a speed well over that of light. Nevertheless, he's been ordered to bring his ship back to Mars so that technicians may check it before he finally takes off. Tommy is out on Pluto now, all poised for launching off into space beyond the Solar System. At last reports, he had made no move to obey the order of the commission. Tommy's backers, angered by the order, called it high-handed, charge there are politics back of it—"

Herb shut off the radio and walked to the door separating the living quarters of the *Space Pup* from the control room.

"Hear that, Gary?" he asked. "Maybe we'll get to see this guy, Evans, after all."

Gary Nelson, puffing at his foul, black pipe, scowled savagely at Herb. "Who wants to see that damn glory grabber?" he snorted.

"What's biting you now?" asked Herb.

"Nothing," said Gary, "except Tommy Evans. Ever since we left Saturn we haven't heard a thing but Tommy Evans out of Donovan."

Herb stared at his tall, lanky partner. "You sure got a bad dose of space poison," he declared. "You been like a dog with a sore head the last few days."

"Who in hell wouldn't get space poison?" snarled Gary. He gestured out through the vision-plate. "Nothing but space," he said. "Blackness with little stars. Stars that have forgotten how to twinkle. Going hundreds of miles a second and you wonder if you're moving. No change in scenery. A few square feet of space to live in. Black space pressing all around you, leering at you, making foul gestures at you—"

He stopped and sat down limply in the pilot's chair.

"How about a game of chess?" asked Herb.

Gary twisted about and snapped at him:

"Don't mention chess to me again, you sawed-off shrimp. I'll space-walk you if you do. So help me Hannah if I don't."

"Thought maybe it would quiet you down," said Herb.

Gary leveled his pipestem at Herb. "Listen," he said, "if I had the guy that invented three-dimensional chess, I'd wring his blasted neck. The old kind was bad enough, but three-dimensional, ten-man—"

He shook his head dismally.

"He must have been half nuts," he said.

"He did go off his head," said Herb, "but not from inventing three-way chess. Guy by the name of Konrad Fairbanks. In an asylum back on Earth. I took a picture of him once, when he was coming out of the courtroom. Just after the judge said he was only half there. The cops chased hell out of me but I got away. The Old Man paid me ten bucks bonus for the shot."

Gary mused.

"I remember that," he said. "Best mathematical mind in the whole system. Worked out equations no one could understand. Went screwy when he found that there were times when one and one didn't quite make two."

Herb walked across the room, stood beside Gary.

"Everything been going all right?" he asked.

Gary growled deep in his throat.

"Sure," he said. "What in hell could go wrong out here? Not even any meteors. Nothing to do but sit and watch. And there isn't much need of that. The robot navigator handles everything."

THE SOFT PUR of the geosectors filled the ship. There was no other sound. The ship seemed standing still in space. Saturn swung far down to the right, a golden disk of light with thin, bright rings. Pluto was a tiny speck of light almost dead ahead, a little to the left. The Sun, three billion miles astern, was shielded from their vision.

The *Space Pup* was headed for Pluto at a pace that neared a thousand miles a second. The geosectors, warping the curvature of space itself, hurled the tiny ship through the void at a speed unthought of less than a hundred years before.

And now Tommy Evans, out on Pluto, was ready, if only the Solar Commerce Commission would stop its interference, to bullet his experimental craft away from the Solar System, out

toward the nearest star, 4.29 light-years distant. Providing his improved electro-gravitic geodesic deflectors lived up to the boast of their inventors, he would exceed the speed of light, would vanish into that limbo of impossibility that learned savants only a few centuries before had declared was unattainable.

"It kind of makes a fellow dizzy," said Herb.

"What does?" asked Gary.

"Why," said Herb, "this Tommy Evans stunt. The boy is making history. And maybe we'll be there to see him do it. He's the first to make a try at the stars—and if he wins, there will be lots of others. Men will go out and out . . . and still farther out, maybe clear out to where space is still exploding."

Gary grunted. "They sure will have to hurry," he observed, "because space is exploding fast."

"Now look here," said Herb. "You can't sit there and pretend the human race has made no progress. Take this ship, just for example. We don't rely on rockets any more except in taking off and landing. Once out in space and what do we do? We set the geosectors to going, and we warp space and build up speed that no rocket could ever hope to give you. We got an atmosphere generator that manufactures air. No more stocking up on oxygen and depending on air purifiers. Same thing with food. The machine just picks up matter and energy out of space and transmutes them into steaks and potatoes—or at least their equivalent in food value. And we send news stories and pictures across billions of miles of space. You just sit down in front of that space-teletypewriter and whang away at the keys, and in a few hours another machine back in New York writes what you have written."

Gary yawned. "Aw, hell," he said, "we haven't started yet. What we have done isn't anything to what the human

race is going to do. That is, if it don't get so downright ornery it kills itself off first."

The teletypewriter in the corner of the room stuttered and gibbered, warming up under the impulse of the warning signals, flung out, hours before, three billion miles away.

The two men hurried across the room and hung over it.

Slowly, laboriously the keys began to tap.

NELSON, ABOARD SPACE PUP, NEARING PLUTO. HAVE INFORMATION EVANS MAY TAKE OFF FOR CENTAURI WITHOUT AUTHORIZATION OF SCC. MAKE ALL POSSIBLE SPEED TO PLUTO. INTERVIEW EVANS IF HE IS THERE. IF HE HAS GONE FLASH US STORY SOON AS POSSIBLE. FOLLOW WITH EVERYTHING YOU HAVE. - MOST IMPORTANT. RUSH. REGARDS.

EVENING ROCKET.

Gary looked at Herb across the machine.

"Maybe that guy Evans has got some guts after all," he said. "Maybe he will tell the SCC where to go. They've been asking for it for a long time. Telling everyone where they can go and where they can't go."

Herb grunted. "They won't chase after him, that's sure."

HE SAT DOWN before the sending board and threw the switch. The hum of the electric generators drowned out the geosectors as they built up the power necessary to hurl a beam of energy across the void to Earth.

"Only one thing wrong with this setup," said Gary. "It takes too much power and it takes too long. I wish someone would hurry up and figure out a way to use the cosmic rays for carriers."

"Doc Kingsley, out on Pluto, has been fooling around with the cosmic," said

Herb. "Maybe he'll turn the trick in the next year or two."

"Doc Kingsley has been fooling around with a lot of things out there," declared Gary. "If he'll talk, we'll have more than one story to send back from Pluto."

The dynamos had settled into a steady drone of power. Gary glanced at a dial and reached out nimble fingers to the keyboard.

NELSON ANSWERING DAILY ROCKET. WILL CONTACT EVANS AT ONCE IF THERE. IF NOT WILL SEND STORY ABOUT FLIGHT. NOTHING TO REPORT OUT HERE. WEATHER FINE. HERB BROKE OUR LAST QUART OF SCOTCH. ASK OLD MAN HOW ABOUT RAISING OUR SALARY.

He grinned at Herb. "How's that?" he asked.

"You didn't have to put that in about the Scotch," declared Herb. "It just slipped out of my fingers."

"Sure," said Gary. "It just slipped out of your fingers. Right smack-dab onto a steel plate and broke all to hell. After this I handle our liquor. When you want a drink, you ask me."

"Maybe Kingsley will have some liquor," said Herb hopefully. "Maybe he'll lend us a bottle."

"If he does," declared Gary, "you keep your paws off of it. Between you sucking away at it and dropping it, I don't get more than a drink or two out of each bottle. We still got Uranus and Neptune to do after Pluto and it looks like a long dry spell ahead."

He got up from the teletype and walked to the fore part of the ship, staring out through the vision-plate.

"Only Neptune and Uranus left," he said. "And that's enough. If the Old Man ever thinks up any more screwy stunts, he can find somebody else to do them. When I get back I'm going to ask him to give me back my old beat at the space terminal and I'm going to stay

there the rest of my days. I'm going to watch ships take off and come in and I'm going to be thankful every time that I'm not on them."

"He's paying us good dough," said Herb. "We got bank accounts piling up back home."

Gary pretended not to hear him.

"'Know Your Solar System,'" he said. "'Special articles run every Sunday in the *Evening Rocket*. Story by Gary Nelson. Pictures by Herbert Harper. Intrepid newspapermen brave perils of space to bring back true picture of the Solar System's planets. One year alone in a spaceship, bringing to the readers of the *Evening Rocket* a detailed account of life in space, of life on the planets.'"

He spat.

"Stuff for kids," he said.

"The kids probably think we're heroes," said Herb. "Probably they read your stories and look at my pictures and then pester their folks to buy them a spaceship. Want to go out and see Saturn."

"The Old Man said it would boost circulation," declared Gary. "Hell, he'd commit suicide if he thought it would boost circulation. Remember what he told us. Says he: 'Go out and visit all the planets. Get firsthand information and pictures. Shoot them back by radio-teletype and space-photo. We'll run them every Sunday in the magazine section.' Just like he was sending us around the corner to cover a fire. That's all there was to it. Just a little over a year out in space. Living in a spaceship and a spacesuit. Hurry through Jupiter's moons to get out to Saturn and then take it on the lam for Pluto. Soft job. Nice, soft, easy job."

His pipe gurgled threateningly and he knocked it out viciously against the palm of his hand.

"Well," said Herb, "we're almost to Pluto. A few days more and we'll be there. They got a fueling station and a

radio station and Doc Kingsley's laboratories out there. Maybe we can promote us a poker game and relax a bit."

Gary walked over to the telescopic screen and switched it on.

"Let's take a look at her," he said.

THE GREAT circular screen glowed softly. Within it swam the image of Pluto, still almost half a billion miles away. A dead planet that shone dully in the faint light of the far-distant Sun. A planet locked in the frigid grip of naked space, a planet that had been dead long before the first stirring of life had taken place on Earth.

The vision was blurred and Gary manipulated dials on a small panel to bring it more sharply into focus.

"Wait a second," snapped Herb. His fingers reached out and grasped Gary's wrist.

"Turn it back a ways," he said. "I saw something out there. Something that looked like a ship. Maybe it's Evans coming back."

Slowly Gary twisted the dial back. A tiny spot of light danced indistinctly on the screen.

"That's it," breathed Herb. "Easy now. Just a little more."

The spot of light leaped into sharper focus. But it was merely a spot of light, nothing more, a tiny, shining thing in space. Some metallic body that was catching and reflecting the light of the Sun.

"Give it more power," said Gary.

Swiftly the spot of light grew, assumed definite shape. Gary stepped the magnification up until the thing filled the entire screen.

It was a ship—and yet it couldn't be a ship.

"It has no rocket tubes," said Herb in amazement. "Without tubes how could it get off the ground? You can't use geosectors in taking off. They twist space all to hell and they'd turn a planet inside out."

Gary studied it. "It doesn't seem to be moving," he said. "Maybe some motion, but not enough to detect."

He hummed softly under his breath. "Funny as hell," he said.

"A derelict," suggested Herb.

Gary shook his head. "Still doesn't explain the lack of tubes," he declared.

The reporter and photographer lifted their eyes from the screen, stared at one another.

"The Old Man said we were to hurry to Pluto and catch Evans," Herb reminded Gary.

Gary looked at the screen again. "To hell with the Old Man," he exploded.

He wheeled about and strode back to the controls. He lowered his gangling frame into the pilot's chair and disconnected the robot control. His fingers reached out, switched off the geosectors, pumped fuel into the rocket chambers.

He glanced over his shoulder.

"Find something to hang onto," he warned. "We're going to stop and see what this is all about."

II.

THE MYSTERIOUS space-shell was only a few miles distant. With Herb at the controls, the *Space Pup* cruised in an ever-tightening circle around the glinting thing that hung there just off Pluto's orbit.

It was a spaceship; of that there could be no doubt, despite the fact it had no rocket tubes. It was hanging motionless. There was no throb of power within it, no apparent life, although dim light glowed through the vision-ports in what probably were the living quarters just back of the control room.

Gary crouched in the air lock of the *Space Pup*, with the outer valve swung back. He made sure that his flame pistols were securely in the holsters and cautiously tested the spacesuit's miniature propulsion units.

He spoke into the tiny radio mike

inside the helmet. "All right, Herb," he said, "I'm going. Try to tighten up the circle a bit. Keep a close watch. That thing out there, for all we know, may be dynamite."

"O. K.," said Herb's voice in the space-phones.

Gary straightened and pushed himself out from the lock. He floated smoothly in space, in a gulf of nothing, a place without direction, without an up or down, an unsubstantial place with the fiery eyes of distant stars ringing him around.

His steel-gloved hands dropped to the propulsion mechanism that encircled his waist. Midget rocket tubes flared with tiny flashes of blue power, and he was jerked forward, heading for the space-shell. Veering too far to the right, he gave the right tube a little more fuel and straightened out.

Steadily, under the surging drive of the miniature tubes, he forged ahead through space toward the ship. He saw the gleaming lights of the *Space Pup* slowly circle in front of him and then pass out of sight.

A quarter of a mile away, he shut off the tubes and glided slowly in to the shell. He struck its pitted side with the soles of his magnetic boots and stood upright.

Cautiously he worked his way toward one of the ports from which glowed the faint light. Lying at full length, he peered through the foot-thick quartz. The light inside was feeble and he could see but little. There was no movement of life, no indication that the shell was tenanted. In the center of what at one time had been the living quarters, he saw a large, rectangular shape, like a huge box. Aside from this, however, he could make out nothing.

Working his way back to the lock, he saw that it was tightly closed. He had expected that. He stamped against the plates with his heavy boots, hoping to attract attention. But if any living

thing were inside, it either did not hear or disregarded the stamping on the outer hull.

Slowly he moved away from the lock, heading for the control-room vision-plate, hoping from there to get a better view into the shell's interior. As he moved, his eyes caught a curious irregular gleam just to the right of the air lock. As if faint lines had been etched into the metal. For a moment he hesitated and then turned back.

Dropping to one knee, he saw that a single line of crude lettering had been etched into the steel of the hull. Possibly with acid.

Brushing at it with a gloved hand, he tried to make it out. Laboriously he struggled with it. It was simple, direct, to the point, a single declaration. When one writes with steel and acid, one is necessarily brief.

The line read:

"Control-room vision-plate unlocked."

AMAZED, he read the line again, hardly believing what he read. But there it was. That single line, written with a single purpose. Simple directions for gaining entrance.

Crouched upon the steel plating, he felt a shiver run through his body. Someone had etched that line in hope someone would come. But perhaps he had come too late. The ship had an old look about it. The lines of it, the way the ports were set into the hull—all marks of spaceship designing that had become obsolete centuries before.

He felt the cold chill of mystery and the utter bleakness of outer space closing in about him. He gazed up over the bulged outline of the shell and saw the steely glare of remote stars. Stars secure in the depths of many light-years, jeering at him, jeering at men who held dreams of stellar conquest.

He shook himself, trying to shake off the probing fingers of half-fear, glanced around to locate the *Space Pup*, saw it

slowly moving off to his right.

Swiftly, but cautiously, he made his way toward the bow of the shell, down over the nose and up to the vision-plate.

Squatting in front of the plate, he peered down into the control cabin. But it wasn't a control cabin. It was a laboratory. In the tiny room which must at one time have housed the instruments of navigation, there was now no trace of control panels or calculators or telescopic screen. Rather, there were work tables, piled with scientific apparatus, banks and rows of chemical containers. All the paraphernalia of the scientist's workshop.

The door into the living quarters where he had seen the large, oblong box was closed. All the apparatus and the bottles in the laboratory were carefully arranged, neatly put away, as if someone had tidied up before they walked off and left the place.

He puzzled for a moment. The lack of rocket tubes, the indications that the ship was centuries old, the scrawled, acid-etched line by the lock, the laboratory in the control room. He shook his head. It didn't make much sense.

Bracing himself against the curving steel hide of the shell, he pushed at the plate. But he could exert little effort. Lack of gravity, inability to brace himself securely, made the task a hard one. Rising to his feet, he stamped his heavy, metallic boots against the quartz, but the plate refused to budge.

As a last desperate measure he might use his flame guns, blast his way into the shell. But that would be long, tedious work. There should be an easier way.

Suddenly it came to him, but at the same moment he realized its hazards. He could lie down on the plate, turn on the rocket tubes of his suit and use his body as a battering-ram. But that was dangerous. It would be easy to turn on too much power, to pound his body to a pulp against the quartz.

Dull anger flared within him.

"Hell," he said, "why not take a chance?"

He stretched flat on the plate, with hands folded under him, fingers on the rocket controls. Slowly he turned the controls. The rockets thrust at his body, bruising him against the quartz. He snapped the studs shut. He believed the plate had given a little. Drawing in a deep breath, he twisted the studs again. Once more his body slammed against the quartz, driven by the flaming tubes.

Suddenly the plate gave way, swung down, plunged him down into the laboratory. Savagely he snapped the studs shut. He struck hard against the floor of the room, cracked his helmet soundly against the metal plates.

Groggily he groped his way to his feet. The thin whine of escaping atmosphere came to his ears, and unsteadily he made his way forward, leaped at the plate, slammed it back in place again. It closed with a thud, driven deep into its frame by the force of the rushing air.

A chair stood beside a table and he swung it around, sat down in it, still dizzy from the fall. He shook his head to clear away the cobwebs.

THERE WAS atmosphere here. That meant that an atmosphere generator was operating. That the ship had developed no leaks, was still air-tight.

He raised his helmet slightly. Fresh, pure air swirled into his nostrils, better air than he had inside his suit. A little highly oxygenated, perhaps, but that was all. If the atmosphere machine had run unattended for a long time, it might have gotten out of adjustment, might be mixing a bit too much oxygen with the air output.

He swung the helmet back and let it dangle on the hinge at the back of his neck, gulped in great breathfuls of the atmosphere. His head cleared rapidly.

He looked around the room from where he sat. There was little to see he

had not already seen. A practical, well-equipped laboratory, but the equipment was old, much of it obsolete.

A framed document stood against a cabinet and getting to his feet, he walked across the room to look at it. Bending close he read it. It was a diploma from the College of Science at Alkatoon, Mars, one of the most outstanding of several universities on the Red Planet. The diploma had been issued to a Caroline Martin.

Gary read the name a second time. It seemed that he should know it. It raised some memory in his brain, but just what it was he couldn't say. An elusive recognition that eluded him by the faintest margin.

He looked around the room. Caroline Martin. A girl who had left a diploma in this room, a pitiful little reminder of many years ago. He bent again and glanced at the date upon the sheep-skin. It was 5976. He whistled softly. A thousand years ago!

Suddenly he started. If Caroline Martin had left the diploma here, where was Caroline Martin now? He swung about on his heel and stared at the door leading into the living quarters. What would he find there?

Striding to the door, he jerked it open and stopped, rigid in his stride over the threshold.

In the center of the room was a tank, securely bolted to the floor by heavy steel brackets. That was the oblong box he had seen from the port outside.

The tank was filled with a greenish fluid, and in the fluid lay a woman. A woman dressed in metallic robes that scintillated in the light from the single radium bulb in the ceiling above the tank.

Breathlessly, Gary moved closer, peered over the edge of the tank, down through the clear green liquid, into the face of the woman. Her eyes were closed, and long, curling black lashes lay against the whiteness of her cheeks.

Her forehead was broad and high, and long braids of raven hair were bound about her head. Slim black eyebrows arched to almost meet above the delicately modeled nose. Her mouth was a bit too large, a trace of patrician in the thin, red lips. Her arms were laid straight along her sides and the metallic gown swept in flowing curves from chin to feet.

Beside her right hand, lying on the bottom of the tank, was a hypodermic syringe, bright and shining despite the green fluid that covered it.

Gary stared at her, the breath catching in his throat. "Lord," he said, "what is this, anyhow?"

She looked alive and yet she couldn't be alive. Still there was a flush of youth and beauty in her cheeks, as if she merely slept.

Laid out as if for death and still with the lie to death in her very look. He stared at the calm, serene face, the arms laid so neatly at her side, the smoothly arranged robe that covered her.

Caroline Martin was the name upon the diploma out in the laboratory. Could this be Caroline Martin? The girl who graduated from the college of sciences at Alkatoon ten centuries ago?

Gary shook his head uneasily.

HE STEPPED BACK from the tank and looked at it, and as he did he saw the copper plate affixed to its metal side. There was wording on the plate. He stooped to read.

Another simple message, etched in copper plate, a message from the girl who lay inside the tank.

"I am not dead. I am in suspended animation. Drain the tank by opening the valve at the opposite end. Use the syringe you find in the medicine chest."

Gary glanced across the room, saw a medicine chest on the wall above a wash-bowl. He looked back at the tank and mopped his forehead with his coat sleeve.

"It isn't possible," he whispered.

Like a man in a dream, he stumbled to the medicine chest, opened it, and found a syringe. He broke it and saw that it was loaded with a cartridge filled with a reddish substance. A drug, undoubtedly, to overcome suspended animation.

Replacing the syringe, he went back to the tank and found the valve. It was stubborn, defying all the strength in his arms. He kicked at it with his heavy boot and jarred it loose. With nervous hands, he opened it and watched the level of the green fluid slowly recede.

Watching, an odd calm crept upon him, a stealing calm that made him hard and machinelike to do the thing that faced him. One little slip might spoil it. A wrong interpretation of the wording on the copper plate. What if the drug in the hypodermic had lost its strength through the years? There were so many things that might happen. But there was only one thing to do. He raised a hand in front of him and looked intently at it. It was steady.

He did not waste time in wondering what it was all about. This was not the time for that. Frantic questioning fingers clutched at his thoughts and he shook them off. Time enough to wonder and to speculate and question when this thing was done.

When the fluid was level with the girl's body he waited no longer. He leaned over the rim of the tank and lifted her in his arms. For a moment he hesitated, then turned and went across the floor to the laboratory, laid her on one of the work tables. The fluid, dripping off the rustling metallic dress, left a trail of wet across the plates.

From the medicine cabinet he took the hypodermic and went back to the girl. He lifted her left arm and peered closely at it. There were little punctures, betraying previous use of a needle.

"Wish I knew more about this," he whispered to himself.

Awkwardly he shoved the needle into

her arm, slowly depressed the plunger. Then it was done and he stepped back.

Nothing happened. He waited.

Minutes passed and she took a shallow breath. He watched in fascination, saw her come to life again. Saw the breaths deepen, the eyelids flicker, her right hand twitch.

Then she was looking at him, out of deep-blue eyes.

"You are all right?" he asked.

It sounded like a foolish question even as he said it, but he had to say something.

Her speech was broken. Her tongue and lips refused to work the way they should, but he understood what she tried to say.

"Yes, I'm all right." She lay quietly on the work table. "What year is it?" she asked.

"It's 6948," he told her.

Her eyes widened and she looked at him. "Almost a thousand years!" she said. "You are sure of the year?"

He nodded. "The year," he declared, "is about the only thing I am sure of."

"How is that?"

"Why, finding you here," said Gary, "and reviving you again. I still don't believe it's happened."

She laughed, a funny, discordant laugh because her muscles, inactive for years, had forgotten how to function rightly.

"You are Caroline Martin, aren't you?" asked Gary.

She started in surprise and rose to a sitting position.

"I am Caroline Martin," she replied. "But how did you know that?"

Gary waved his arm toward the framed diploma. "I read it."

"Oh," she said, "I'd forgotten all about it."

"I am Gary Nelson," Gary told her. "Newspaperman on the loose. My pal's out there in a spaceship waiting for us."

"I suppose," she said, "that I should thank you, but I don't know how. Just

ordinary thanks aren't quite enough."

"Skip it," said Gary tersely.

She stretched her arms above her head.

"It's good to be alive again," she said. "Good to know there's life ahead of you."

"But," said Gary, "you always were alive. It must have been just like going to sleep."

"It was worse than death," she said.

"Because, you see, I made one mistake."

"One mistake?"

"Yes, just one mistake. One you'd never think of. At least I didn't. You see, when animation was suspended, every physical process was slowed down to almost zero. But with one exception. My brain kept right on working."

THE HORROR of it sank into Gary slowly. "You mean you knew? You laid here for years and knew that you were here?"

She nodded. "I couldn't hear or see or feel. I had no bodily sensation. But I could think. I've thought for almost ten centuries. I tried to stop thinking, but I never could. I prayed something would go wrong and I would die. Anything to end that eternity of thought."

She saw the pity in his eyes.

"Don't waste sympathy on me," she said and there was a note of hardness in her voice. "I brought it on myself. Stubbornness, perhaps. I played a long shot. Took a gamble."

He chuckled in his throat. "And won," he said.

"A million to one shot," she said. "Probably even greater odds than that. This shell is a tiny speck in space. There wasn't a million-to-one shot, no, not even a billion-to-one shot, that anyone would find me. I had some hope. I placed my faith on someone, but I guess they failed me. Perhaps it wasn't their fault."

"But how did you do it?" asked Gary. "Even today it has our scientists

stumped. They have made some progress, but not much. But you made it work for almost a thousand years."

"Drugs," she said. "Certain Martian drugs. Rare ones. And they have to be combined correctly. Slow metabolism to a point where it is almost nonexistent. But you have to be careful. Slow it down too far and metabolism stops. That's death."

Gary gestured toward the hypodermic. "And that," he said, "reacts against the other drug."

She nodded gravely.

"The fluid in the tank," he said. "That was to prevent dehydration and held some food value? You wouldn't need much food with metabolism at nearly zero. But how about your mouth and nostrils? The fluid—"

"A mask," she said. "Chemical paste that held up under moisture. Evaporated as soon as it was struck by air."

He whistled. "You thought of everything," he said.

"I had to," she declared. "There was no one else to do my thinking for me."

She slid off the table and walked slowly toward him. "You told me a minute ago," she said, "that the scientists of today haven't satisfactorily solved suspended animation?"

He nodded.

"You mean to say they still don't know about these drugs?"

"No," he said. "There's some of them would give their right eyes to know about them."

"We knew about them a thousand years ago," the girl said. "Myself and one other. I wonder—"

She stopped, musing.

He waited, but she did not continue.

She whirled on him. "Let's get out of here," she cried. "I have a horror of this place."

"O. K.," said Gary. "Have you an extra spacesuit around?"

"There's one in a cabinet beside the air lock," she told him. "Probably it's

still in good condition."

"Anything you want to take?" he asked. "Anything I can get together for you."

She made an impatient motion.

"No," she said. "I want to forget this place."

III.

THE *SPACE PUP* arrowed steadily toward Pluto. From the engine room came the subdued hum of the geosectors. The vision-plate looked out on ebon space with its far-flung way posts of tiny, steely stars. The speedometer needle was climbing up toward the thousand-mile-per-second mark.

Caroline Martin leaned forward in her seat and stared out at the vastness that stretched eternally ahead. "I could stay and watch forever," she exulted.

Gary, lounging back in the pilot's seat, said quietly: "I've been thinking about that name of yours. It seems to me I've heard it somewhere. Read it in a book."

She glanced at him swiftly and then stared out into space again.

"Perhaps you have," she said, finally.

There was a silence, unbroken except by the humming of the geosectors.

The girl turned back to Gary, cupped her chin in her hands.

"Probably you have read about me," she said. "Perhaps the name of Caroline Martin is mentioned in your histories. You see, I was a member of the old Mars-Earth Research Commission during the war with Jupiter. I was so proud of the appointment. Just four years out of school and I was trying so hard to get a good job in some scientific research work. I wanted to earn money to go to school again."

"I am beginning to remember now," said Gary, "but there must be something wrong. The histories say you were a traitor. They say you were condemned to death."

"I was a traitor," she said and a thread

of ancient bitterness ran through her words. "I refused to turn over a discovery I made. A discovery that would have won the war. It also would have wrecked the Solar System. I told them so. But they were men at war. They were desperate men. We were losing then."

"We never really did win," said Gary.

"They condemned me," she said, "to worse than death. They sentenced me to space. They put me in that shell you found me in, and a war cruiser towed it out to Pluto's orbit and turned it loose. It was an old condemned craft, its machinery outmoded. They ripped out the rocket tubes and turned it into a prison for me."

"Why, that's a foul trick—foul even for that half-civilized crowd of a thousand years ago" roared Herb.

"Just men at war," said the girl. "Cruel men. They put the laboratory in the control room as a final ironic jest. So I could carry out my experiments. Ones, they said, I'd never need to turn over to them."

"Would your discovery have wrecked the System?" asked Gary.

"Yes," she said. "It would have. That's why I refused to give it to the military board. For that they called me traitor."

"They never found your notes," said Gary.

She tapped her forehead with a slender finger. "My notes were here," she said.

He looked amazed.

"And still are," she added.

"But how did you get the drugs to carry out your suspended animation plans?" asked Gary.

She waited for long minutes.

"That's the part I hate," she said. "The part that's hard to think about. You see, I worked with a young man. About my age, then. He must be dead these many years."

SHE STOPPED and Gary could see that she was trying to marshal in her mind what next to say. "We were in love," she said. "Together we discovered the suspended animation process. Worked on it secretly for months and were ready to announce it when I was taken before the military tribunal. They never let me see him after that. I was allowed no visitors.

"Out in space, after the war cruiser left, I almost went insane. I invented all sorts of tasks to do. I arranged and rearranged my chemicals and apparatus and then one day I found the drugs, skillfully hidden in a box of chemicals I had never bothered to unpack. Only one person in the world beside myself knew about them. The drugs and two hypodermic syringes."

Gary's pipe had gone out and he relit it.

The girl went on.

"I knew it would be a gamble," she said. "I knew that he intended I should take that gamble. Maybe he had a wild scheme of coming out and hunting for me. Maybe something happened and he couldn't start. Maybe he tried and failed. Maybe . . . the war got him. But he had given me a chance, a desperate chance to beat the fate the military court had set for me. I removed the steel partition in the engine room to make the tank. That took many weeks. I etched the copper plate. I went out on the shell and etched the lines beside the lock. I'm afraid that wasn't a very good job."

"And then," said Herb, "you put yourself to sleep."

"Not exactly sleep," she said. "Because my brain still worked. I thought and thought for almost a thousand years. My mind set up problems and worked them out. I developed a flair for pure deduction, since my mind was the only thing left for me to work with. I believe I even developed telepathic powers."

"You mean," asked Herb, "that you can read our thoughts?"

She nodded, then hastened on. "But I wouldn't," she said. "I wouldn't do that to my friends. I knew when Gary first came to the shell. I read the wonder and amazement in his thoughts. I was so afraid he'd go away and leave me alone again. I tried to talk to him with my thoughts, but he was so upset he couldn't understand."

Gary shook his head. "Who wouldn't have been upset?" he asked.

"But," exploded Herb, "think of the chances that you took. It was just pure luck we found you. Your drug wouldn't have held up forever. Another thousand years perhaps, but scarcely longer. Then there was the chance that the atmosphere generators might have failed. Or that a big meteor would come along. There were a thousand things that might have happened."

She agreed with him. "It was a long chance. I knew it was. A gamble. But there was no other way. I could have sat still and done nothing, grown old and died."

She was silent for a moment.

"It would have been easy," she declared then, "if I hadn't made that one mistake. A thousand years of thought is something I wouldn't want to try again."

"Weren't you frightened?" Gary asked.

Her eyes widened slightly and she nodded.

"I heard voices," she said. "Voices coming out of space, out of the void that lies between the galaxies. Things talking over many light-years with one another. Things to which the human race would appear mere insects. At first I was frightened. Frightened at the things they said, at the horrible hints I sensed in the things I couldn't understand. Then, growing desperate, I tried to talk back to them. I wasn't afraid of them any more. I thought maybe they could help. I didn't care much what hap-

pened just so some one would help me."

Gary lit his pipe again and silence fell for just a space.

"Voices," said Herb. "Voices out of space."

THEY ALL STARED out into the blackness that hemmed them in. Gary felt the hairs bristle at the nape of his neck. Some cold wind from far away had brushed across his face. An unnamable terror out of the cosmos reaching out, searching for him. Things that talked across the back-yard fence of many light-years. Things that hurled pure thought across the deserts of emptiness that lie between the galaxies.

"Tell me," said Caroline, and her voice, too, seemed to come from far away, "how did the war come out?"

"The war?" asked Gary.

Then he understood.

"Oh, the war," he said. "Why, Earth and Mars finally won. Or so the histories claim. There was a battle out near Ganymede, and both fleets limped home pretty badly battered up. The Jovians went back to Jupiter. The Earth-Mars fleet pulled into Sandebar on Mars. For months the two inner planets built up their fleets and strengthened home defense. But the Jovians never came out again, and our fleet didn't dare invade Jupiter. Even today we haven't developed a ship that dares go into Jupiter's atmosphere. Our geo-sectors might take us there and bring us back, but you can't use them near a planetary body. They work on the principle of warping space—"

"Warping space?" asked the girl, suddenly sitting upright.

"Sure," said Gary. "Anything peculiar about it?"

"Why, no," she said. "I don't suppose there is."

Then: "I wouldn't exactly call that a victory."

"That's what the histories call it," Gary shrugged. "They claim we run the

Jovians to cover and they've been afraid to come out ever since. Earth and Mars have taken over Jupiter's moons and colonized them, but to this day no one has ever sighted a Jovian or a Jovian ship. Not since that day back in 5980."

"It's just one of those things," declared Herb.

(The girl was staring out at space again. Hungry for seeing, hungry for living, but with the scars of awful memory etched into her brain. A thousand years of thought.)

Gary shuddered. Alone, she had taken a magnificent gamble and had won. Won against time and space and the brutality of man.

(What had she thought of during those long years? What problems had she solved? What kind of a person could she be?)

Gary nursed the hot bowl of the pipe in his hands and gazed at her head, outlined against the vision-glass. Square chin, high forehead, the braided strands wrapped about her head.

(What was she thinking of now? Of that lover of a thousand years ago? Of how he might have tried to find her, of how he may have searched through space and failed? Or was she thinking of those voices . . . the voices talking back and forth across the gulfs of empty space?)

The teletype, squatting in the corner, broke into a gibbering chatter.

Gary sprang to his feet.

"Now what?" he asked.

Caroline had swung around. Herb was on his feet.

The chattering ceased and the machine settled down to the *click-clack* of a message.

Gary hurried forward. The other two pressed close behind, looked over his shoulder.

NELSON, ABOARD SPACE PUP,
NEARING PLUTO. DOCTOR
KINGSLEY ON PLUTO REPORTS
RECEIVING STRANGE MESSAGES

FROM SOMEWHERE OUT OF SOLAR SYSTEM. UNABLE TO EVEN GUESS AT SOURCE. REFUSES TO GIVE CIRCUMSTANCES UNDER WHICH MESSAGES WERE RECEIVED OR CONTEXT OF THEM IF, IN FACT, HE KNOWS CONTEXT. URGENT THAT YOU GET STORY IMMEDIATELY UPON ARRIVAL. REGARDS."

"EVENING ROCKET."

The machine's stuttering came to an end.

The three stared at one another.

Again the cold wind from outer space seemed to brush against Gary's face. He raised his hand and scrubbed his chin. Two days' growth of beard made a grating sound.

Herb looked at him with widening eyes. "Messages out of space," he said.

Gary shook his head. He stole a swift glance at the girl. Her face seemed pale. Perhaps she was remembering.

"Herb," he said, "there's something funny going on."

IV.

TRAIL'S END, Pluto's single community, crouching at the foot of a towering black mountain, seemed deserted. There was no stir of life about the buildings that huddled between the space-field and the mountains. The spiraling tower of the radio station climbed dizzily upward and beside it squatted the tiny radio shack. Behind it stood the fueling station and the hangar, while half a mile away loomed the larger building that housed the laboratories of the Solar Science Commission.

Caroline moved closer to Gary.

"It seems so lonely," she whispered. "I don't like loneliness now . . . after—"

Gary stirred uneasily, scraping the heavy boots of his spacesuit over the pitted rock. "It's always lonely enough," he said. "I wonder where they are."

As he spoke, the lock of the radio

shack opened and a spacesuited figure strode across the field to meet them.

His voice crackled in their helmet-phones. "You must be Nelson," it said. "I'm Ted Smith, operator here. Dr. Kingsley told me to bring you up to the house right away."

"Fine," said Gary. "Glad to be here. I suppose Evans is still around."

"He is," said Smith. "He's up at the house now. His ship is in the hangar. Personally, I figure he is planning to take off and let the SCC try to chase him."

Smith fell in step with them. "It's good to see new faces," he declared. "specially a woman. We don't have women visitors very often."

"I'm sorry," said Gary. "I forgot."

He introduced Caroline and Herb to Smith as they plodded past the radio shack and started for the laboratory.

"It gets lonesome out here," said Smith. "This is a hellish place, if I do say so myself. No wind. No moon. Nothing. Very little difference between night and day, because there's never any clouds to cover the stars and even in the daytime the Sun is no better than a star."

His tongue, loosened by visitors to talk to, rambled on.

"A fellow gets kind of queer out here," he told them. "It's enough to make anyone get queer. I think the doctor is half crazy from staying here too long. He thinks he's getting messages from some place far away. Acts mysterious about it."

"You think he just imagines it?" asked Herb.

"I'm not saying one way or the other," declared Smith, "but I ask you . . . where would you get messages from? Think of the power it would take just to send a message from Alpha Centauri. And that isn't so very far away. Not as far as stars go. Right next door you might say."

"Evans is going to fly there and back,"

Herb reminded him.

"Evans is space-nuts," said Smith. "With all the Solar System to fool around in, he has to go gallivanting off to the stars. He hasn't got a chance. I told him so, but he laughed at me. I'm sorry for him. He's a nice young fellow."

They mounted the steps, hewn out of living stone, which led to the main air lock of the laboratory building. Smith pressed the buzzer button and they waited.

"I suppose you'll want Andy to put your ship in the hangar and go over it," Smith suggested.

"Sure," said Gary. "Tell him to take good care of it."

"Andy is the fueling-station man," the radio operator explained. "But he hasn't much to do now. Most of the ships use geosectors. There's only a few old tubs, one or two a year, that need any fuel. Used to be a good business, but not any more."

The space lock swung open and the three stepped inside. Smith remained by the doorway.

"I have to go back to the shack," he said. "I'll see you again before you leave."

The lock hissed shut behind them and the inner screw began to turn. It swung open and they stepped into a small room that was lined with spacesuits hanging on the wall.

A man was standing in the center of the room. A big man, with broad shoulders and hands like hams. His unruly shock of hair was jet-black and his voice boomed jovially at them.

"Glad to see all of you," he said and laughed, a deep, thunderous laugh that seemed to shake the room.

Gary swung back the helmet of his suit and thrust out a gloved hand.

"You are Dr. Kingsley?" he asked.

"That's who I am," boomed the mighty voice. "And who are these folks with you?"

Gary introduced them.

"I didn't know there was a lady in the party," said the doctor.

"There wasn't," said Herb. "Not until just recently."

"Mean to tell me they've taken to hitch-hiking out in space?"

Gary laughed. "Even better than that, doctor," he said. "There's a little story about Miss Martin you'll enjoy."

"Come on," he roared at them. "Get out of your duds. I got some coffee brewing. And you'll want to meet Tommy Evans. He's that young fool who thinks he's going to fly four light-years out to old A. C."

And at just that moment Tommy Evans burst into the room.

"Doc," he shouted, "that damn machine of yours is at it again."

Dr. Kingsley turned and lumbered out, shouting back at them.

"Come along. Never mind the suits."

THEY RAN behind him as he lumbered along. Through what obviously were the laboratory's living quarters, through a tiny kitchen that smelled of boiling coffee, into a workroom bare of everything except a machine that stood in one corner. A red light atop the machine was blinking rapidly.

The machine was a wonder in complexity, a spidery confusion of tubes and wires, an elaborate network of metal parts.

Dr. Kingsley lowered his huge frame into a chair before it, lifted a domed helmet and set it on his head. A pencil lay beside a pad of paper and he clutched at it, poised it over the pad as if to write. But the pencil remained poised and lines of concentration deepened in Kingsley's face. His left hand went up to the helmet and twisted knobs and dials.

Gary watched in amazement.

It must be over this contraption that Kingsley was receiving his mysterious messages. But he seemed to be having trouble. The message apparently wasn't

coming in right.

The red light went dead and the doctor snatched the helmet from his head.

"Nothing again," he said, swinging about in his chair.

He rose slowly and there were lines of disappointment on his face, but his voice boomed as jovially as ever.

He flipped a hand at Tommy Evans.

"Meet Evans," he said. He introduced them in turn.

"Newspaper folks," he explained. "Out writing up the *Solar System*. Doing a good job of it, too. The last supply ship brought some *Evening Rockets*. Read your articles about the moons of Jupiter. Mighty interesting."

He lumbered back to the kitchen and poured coffee while they took off their spacesuits.

"I suppose," he said, "you're wondering what it's all about."

Gary nodded. "My office notified me," he replied. "Asked me to get a story about it. I hope you can help me out."

Dr. Kingsley sipped at a steaming cup.

"Not much to tell," he said. "And a lot of it is off the record stuff. Afraid there isn't any story . . . yet."

Evans laughed shortly. "Don't be that way, doc," he said. "You know you've got plenty to tell him. Go ahead and spill it. He'll keep out what you say is off the record."

Dr. Kingsley looked questioningly at Gary.

"Whatever you say is off the record, is off the record," Gary told him.

"There's so much of it," rumbled the doctor, "that sounds like sheer dream stuff."

"Hell," said Evans, "there always is in everything new. My ships sound like it, too. But the thing will work. I know it will."

Doctor Kingsley perched himself on a heavy kitchen chair.

"It started more than a year ago," he said. "We were studying the cosmic

ray. Elusive thing, those rays. Men have studied them for about five thousand years, and they still don't know as much about them as you'd think they would. We thought we'd made a big discovery, for our instruments, used on top of the building, showed the rays came in definite patterns. Not only that, but they came in definite patterns at particular times. We developed new equipment and learned more about the pattern. We learned that the pattern occurred only when Pluto had rotated into such a position that this particular portion of the planet was facing the Great Nebula in Andromeda. We learned that the pattern, besides having a certain fixed physical structure, also had a definite time structure, and that the intensity of the bombardment always remained the same. In other words, the pattern never varied as to readings; it occurred at fixed intervals whenever we directly faced the Great Nebula, and the intensity varied very slightly, showing an apparent constant source of energy operating at specific times. In between those times our equipment registered the general haphazard behavior one would expect in cosmic rays."

THE DOCTOR rumbled on. "The readings had me down," he said. "Cosmic rays shouldn't behave that way. There had never been any instance of their behaving that way before. Of course, this was the first thorough investigation far from the Sun's interfering magnetic fields. And why should they behave in that manner only when we were broadside to the Great Nebula?"

"My two assistants and I worked and studied and theorized, and it finally boiled down to just one thing. The things we were catching with our instruments weren't cosmic rays at all. They were something else. Something new. Some strange impulse coming to us from outer space. Almost like a signal. Like something or somebody or God

knows what signaling to someone or something stationed here on Pluto. We romanticized a bit. We toyed with the idea of signals coming from another galaxy, for you know the Great Nebula is an exterior galaxy, a mighty star system, some nine hundred million light-years across intergalactic space."

"If you'd let me send that back to the *Evening Rocket*," said Gary, "we'd make you famous overnight."

"But you can't," rumbled Dr. Kingsley, "because these are just imaginings. Nothing to support them in the light of factual truth. We still aren't sure what it's all about, though we know a great deal more than we did then."

"The facts we did gather, you see, indicated that whatever we were receiving must be definite signals. Must originate within some sort of intelligence. Some intelligence, you see, that would know just when to send them. But there was the problem of distance. Just suppose for a moment that they were coming from the Great Nebula. It takes light almost a million years to reach us from the Nebula. While it is very possible that the speed of light can be far exceeded, there is little reason to believe, at present, that anything could be so much faster than light that signaling could be practical across such enormous space. Unless the matter of time were mixed up a little, and when you get into that you have a problem that takes more than just a master mind. There was just one thing that would seem a probable answer. That if the signals were being sent from many light-years distant, they were being routed through something else than all that space, through another continuum of space-time, through what you might, for want of a better term, call the fourth dimension."

"Doctor," said Herb, "you got me all balled up."

Dr. Kingsley's chuckle rumbled through the room.

"It had us that way, too," he said. "And then we figured that maybe we were getting pure thought. Thought telepathed across the light-years of unimaginable voids. Just what the speed of thought may be, no one knows. It may be instantaneous, or it may be no greater than the speed of light . . . or it may be many times the speed of light. But we do know one thing: that the signals we are receiving are the projection of thought. Whether they come straight through space, or whether they travel through some short cut, through some manipulation of space-time frames, I do not know. Probably I never will know.

"It took us months to invent that machine you saw in the other room. Briefly, it picks up the signals, translates them from the pure energy of thought into actual thought, into thoughts that we can read. We also developed a means of sending our own thoughts back, of communicating with whatever it was that was trying to talk to Pluto. So far we haven't been successful in getting an entire message across. However, apparently we have succeeded in advising whoever is sending out the messages that we are trying to answer, for recently the messages have changed, have a note of desperation, frantic commands, almost a pleading quality."

He brushed his coat sleeve across his brow.

"It is all so confusing," he confessed.

"But," asked Herb, "why would anyone send messages to Pluto? Until men came out here, there wasn't anything here. Nothing with intelligence. Just a barren planet. Without any atmosphere. Too cold for anything to live. The tail end of creation."

Dr. Kingsley stared solemnly at Herb.

"Young man," he said, "we must never take anything for granted. How are we to say that there never was any intelligence on Pluto? How do we know

that a great civilization might not have risen and flourished here æons ago? How do we know that an expeditionary force from some far-distant star might not have come here and colonized this outer planet many years ago?"

"It don't sound reasonable," said Herb.

Dr. Kingsley gestured impatiently.

"Neither do these signals sound reasonable," he rumbled. "But there they are. I've thought about the things you mention. I am damned with an imagination, something no scientist should have. A scientist should just plug along, applying this bit of knowledge to that bit of knowledge to arrive at something new. He should leave the imagination to philosophers. But I'm not that way. I try to imagine what might have happened or what is going to happen. I've imagined a mother planet groping out across all space, trying to get in touch with some long-lost colony here on Pluto. I have imagined someone trying to reestablish communication with a people who lived here millions of years ago. But it doesn't get me anywhere."

GARY FILLED and lit his pipe, frowned down at the glowing tobacco. Voices in space again. Voices talking across the void. Saying things to rack the human soul. "Doctor," he said, "you aren't the only one who has heard thought from outer space."

Dr. Kingsley swung on him, almost belligerently. "Who else?" he demanded.

"Miss Martin," said Gary quietly, puffing at his pipe. "You haven't heard Miss Martin's story yet. I have a hunch that she can help you out."

"How's that?" rumbled the scientist.

"Well, you see," said Gary softly, "she's just passed through a thousand years of mind training. She's thought without ceasing for almost ten centuries."

Dr. Kingsley's face drooped in amaze-

ment. "But that's impossible," he protested.

Gary shook his head. "Not impossible, at all. Not with suspended animation."

Dr. Kingsley opened his mouth to object again, but Gary hurried on. "Doctor," he asked, "do you remember the historical account of the Caroline Martin who refused to give an invention to the military board during the Jovian war?"

"Why, yes," said Dr. Kingsley, "we scientists have speculated for many years on just what it was she found—"

He started out of his chair.

"Caroline Martin," he shouted.

He looked at the girl.

"Your name is Caroline Martin, too," he whispered huskily.

Gary nodded. "Doctor," he said, "this is the woman who refused to give up that secret a thousand years ago."

V.

Dr. Kingsley glanced at his wrist watch.

"It's almost time for the signals to begin," he said. "In another few minutes we will be swinging around to face the Great Nebula. If you looked out you'd see it just over the horizon now."

Caroline Martin sat in the chair before the thought machine, the domed helmet settled on her head. All eyes in the room were glued on the tiny light atop the mechanism. When the signals started coming in that light would blink its bright-red eye.

"Lord, it's uncanny," whispered Tommy Evans. He brushed at his face with his hand.

Gary watched the girl. Sitting there so straight, like a queen with a crown upon her head. Sitting there, waiting—waiting to hear something that spoke across the gulfs that took light many years to span.

Brain sharpened by a thousand years

of thought, a woman who was schooled in hard and simple logic. She had thought of things out in the shell, she said. Had set up problems and had worked them out. What were those things she had thought about? What new mysteries had she solved? She was a young, rather sweet-faced kid, who ought to like a good game of tennis, or a dance—and she'd thought a thousand years.

Then the light began to blink and Gary saw Caroline lean forward, heard the breath catch in her throat. The pencil that she had poised above the pad dropped from her fingers and rolled onto the floor.

A heavy silence engulfed the room, broken only by the whistling of the breath in Dr. Kingsley's nostrils. He whispered to Gary: "She understands . . . she understands!"

But Gary waved him into silence.

The red light blinked out and Caroline swung slowly around in the chair. Her eyes were wide and for a moment she seemed unable to give voice to words.

Then she spoke. "They think they are contacting someone else," she said. "Some great civilization that must have lived here at one time. The message comes from far away. From even farther than the Great Nebula. The Great Nebula just happens to be in the same direction. They are puzzled that we do not answer. They know someone has been trying to answer. They're trying to help us to get through. Scientific terms I could not understand. Something to do with warping of space and time, but involving principles that are entirely new. They are impatient. They want something. It seems there is great danger some place. They think that we can help."

"Great danger to whom?" asked Dr. Kingsley.

"I couldn't understand," Caroline told him.

"Can you talk back to them?" asked

Gary. "Do you think you can make them understand?"

"I'll try," she said.

"All you have to do is think," rumbled Dr. Kingsley. "Think clearly. The helmet picks up the thoughts and sends them through the thought projector."

Her slim fingers reached out and turned a dial. Tubes came to life and burned into a blue intensity of light. A soaring hum of power filled the tiny room. She was turning the dial slowly, building up the power.

Gary sucked in his breath and waited.

The hum became a steady drone and the tubes were filled with a light that hurt one's eyes.

"She's talking to them now," thought Gary. "She's talking to them."

THE MINUTES seemed eternities, and then the girl reached out and closed the dial. The hum of power receded, shut off and was replaced by a deathly silence.

"Did they understand?" asked Dr. Kingsley, and even as he spoke the light blinked red again.

Kingsley's hand closed around Gary's arm and his harsh whisper rasped in Gary's ear. "*Instantaneous!*" he said. "Instantaneous signals! They got her message and they're answering. That means the signals are routed through some extra-dimension."

Swiftly the red light blinked. Caroline crouched forward in the chair, her body tensed with what she heard.

The light blinked off and the girl reached up and tore off the helmet.

"It can't be right," she sobbed. "It can't be right."

Gary sprang forward, put an arm around her shoulders.

"What's wrong?" he asked.

"Those messages," she cried. "They come from the very edge of all the universe . . . from the farthest rim of *exploding space!*"

Dr. Kingsley leaped to his feet.

Tommy Evans and Herb Harper remained in their chairs, apparently incapable of movement.

"They are like the voices I heard before," she said. "But different, somehow. More kindly . . . but terrifying even so. These things are so far away. So very far away. Galaxies and galaxies away."

She drew a deep breath.

"They are baffled," she went on. "They do not seem to understand who we are. They think they are talking to someone else. To a people they talked to here on Pluto thousands of years ago . . . maybe millions of years ago."

Gary looked at Kingsley and the scientist stared back. Gary shook his head in bewilderment and Kingsley rumbled in his throat.

"At first," Caroline whispered, "they referred to us by some term that had affection in it . . . actual affection, as if there were blood ties between them and the things they were trying to talk to here. The things that must have disappeared centuries ago."

"Longer ago than that," rumbled Kingsley. "That the thought bombardment is directed at this spot would indicate the beings they are trying to reach had established some sort of center, possibly a city, on this site. There are no indications of former occupancy. If anyone ever was here, every sign of them has been swept away. And here there is no wind, no weather, almost no change. A billion years ago—"

"But who are they?" asked Gary. "These ones you were talking to. Did they tell you that?"

She shook her head. "I couldn't exactly understand. As near as I could get it, they called themselves the Cosmic Engineers. That's a very poor translation. Not sufficient at all. There is a lot more to it."

She paused as if to marshal a definition. "As if they were self-appointed guardians of the entire universe," she

explained. "Champions of all things that live within its space-time frame. And something is threatening the universe. Some mighty force out beyond the universe . . . out where there's neither time nor space.

"They want our help," she said.

"But how can we help them?" asked Herb.

"I don't know. They tried to tell me, but the thoughts they used were too abstract. I couldn't understand entirely. A few clues here and there. They'll have to reduce it to simpler terms."

"We couldn't even get there to help them," said Gary.

"Maybe," suggested Tommy Evans, "we don't need to go there. Maybe we can do something here to help them."

The red light was winking again. Caroline saw it and reached for the helmet, put it on her head. The light clicked out and her hand went out and moved a dial. Again the tubes lighted, and the room trembled with the surge of power.

Dr. Kingsley was mumbling. "The edge of space. But that's impossible!"

Gary laughed silently at him. "Getting jittery, doctor?"

The power was building up. The room throbbed with it and the blue tubes threw dancing shadows on the wall.

GARY FELT the cold wind from space flicking at his face again. Felt the short hairs rising at the base of his skull.

Jittery? Who in hell wouldn't get jittery at a thing like this? A message from the rim of space! From that remote area where Time and Space still surged outward into that no man's land of nothingness—into that place where there was no Time or Space, where nothing had happened yet, where nothing had happened ever. He tried to imagine what would be there. Many years ago some old philosopher had said that the only two conceptions of which

man was capable were time and space, and from these two conceptions he built the entire universe. If this were so, how could one imagine a place where neither time nor space existed? If space ended, what was the stuff beyond that wasn't space?

Caroline was closing the dial again. The blue lights dimmed, the hum of power ebbed off and stopped. And once again the red light atop the thought machine was blinking rapidly.

He watched the girl closely. Saw her body tense and then relax. Saw her bend forward, intent upon the messages that were swirling through the helmet.

Kingsley's face was puckered with lines of wonderment. He still stood beside his chair, a great bear of a man, with his hamlike hands opening and closing, hanging loosely at his sides.

Those messages were instantaneous. That meant one of two things; that thought itself was instantaneous or that the messages were routed through a space-time frame which shortened the distance, that, through some manipulation of the continuum, the edge of space might be only a few feet or a few miles distant. That, starting now, one might walk there in just a little while.

Caroline was taking off her helmet, slowly pivoting around in her chair. They all looked at her questioningly, but not a word was spoken.

"I understand a little better now," she said. "They are friends of ours . . . those Engineers."

"Friends of ours?" asked Gary.

"Friends of everything within the universe," said Caroline. "Trying to protect the universe. Calling for volunteers to help them save it from some great danger . . . from that outside force."

She smiled at the circle of questioning faces.

"They want us to come out to the edge of the universe," she said, and there

was a tiny quaver of excitement in her voice.

Herb's chair clattered to the floor as he leaped to his feet. "They want us—" he started to shout and then stopped and the room swam in heavy silence.

Gary heard the rasp of breath in Kingsley's nostrils, sensed the effort he was making to control himself as he shaped a simple question.

"How do they expect us to get out there?" he asked.

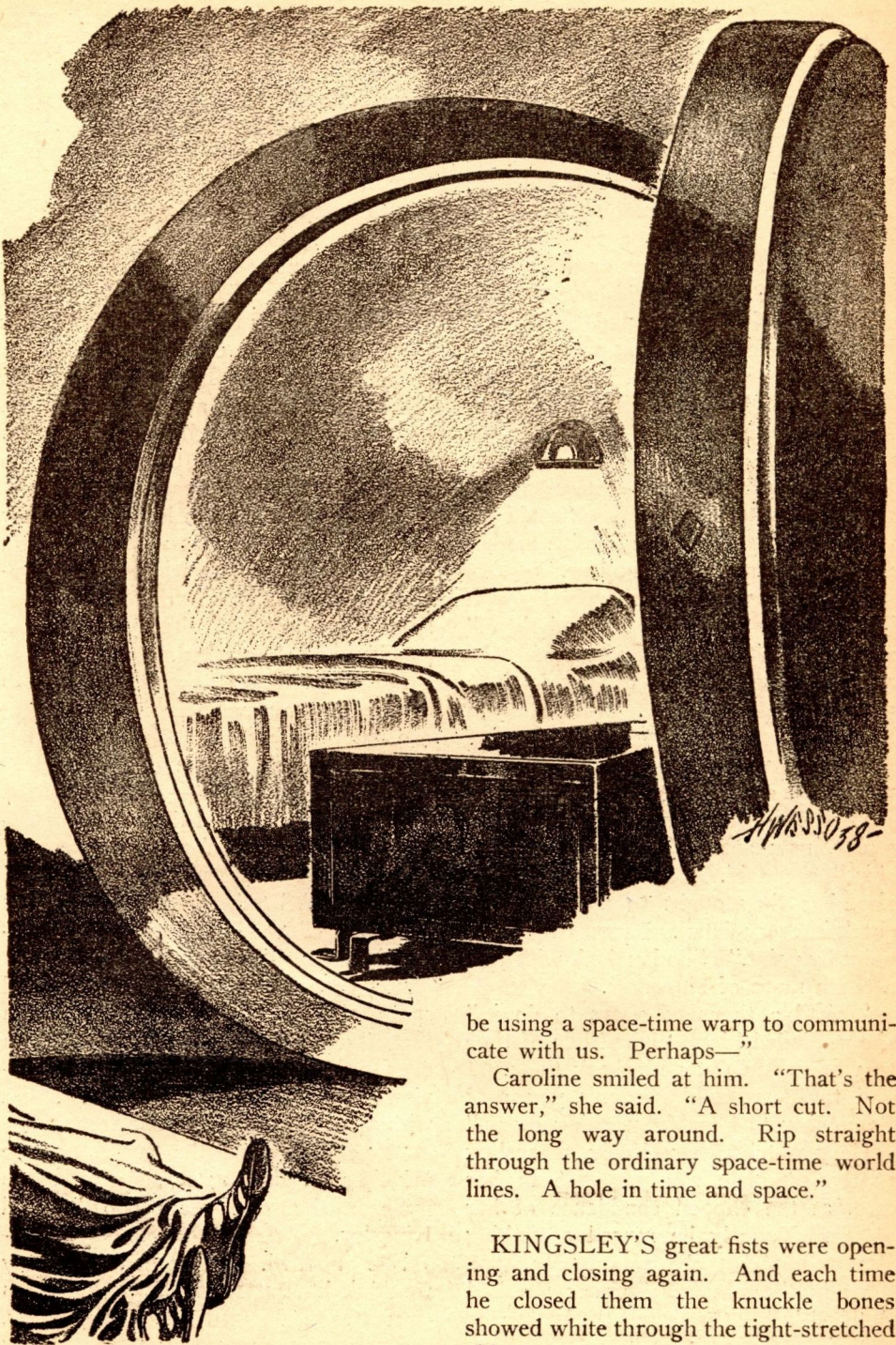
"My ship is fast," said Tommy Evans,

"faster than anything ever built before. But not that fast."

"A space-time warp," he said, and his voice was oddly calm. "They must



*As he injected the fluid, through
his brain pounded the thought of
that sleep—a thousand years—
ten centuries asleep—*



be using a space-time warp to communicate with us. Perhaps—”

Caroline smiled at him. “That’s the answer,” she said. “A short cut. Not the long way around. Rip straight through the ordinary space-time world lines. A hole in time and space.”

KINGSLEY’S great fists were opening and closing again. And each time he closed them the knuckle bones showed white through the tight-stretched skin.

"But . . . but—" Kingsley was stammering.

"How will we do it?" asked Herb. "There isn't a damn one of us in this room could do it. We play around with geosectors that drive our ships and think we're the tops in progress. But the geosectors just warp space any old way. No definite pattern, nothing. Like a kid playing around in a mud puddle, pushing the mud this way or that. This would take control—you'd have to warp it in a definite pattern and then you'd have to make it stay that way."

"Maybe the Engineers," said Tommy.

"That's it," nodded Caroline. "The Engineers can tell us. They know the way to do it. All we have to do is follow their instructions."

"But," protested Kingsley, "could we understand? That must involve mathematics that are way beyond us."

Caroline's voice cut sharply through his protest. "I can understand them," she replied bitterly. "Maybe it will take a little thought, but I can work them out. I've had . . . practice, you know."

Kingsley was dumfounded. "You can work them out?"

"I worked out new mathematical formulas, new space theories out in the ship," she said. "They're only theories, but they ought to work. They check in every detail. I went over them point by point." She laughed, with just a touch more of bitterness.

"I had a thousand years to do it," she reminded him. "I had lots of time to work them out and check them. I had to do something, don't you see? Something to keep from going crazy."

Gary watched her closely, marveling at the complete self-assurance in her face, at the clipped confidence of her words. Vaguely he sensed something else, too. That she was leader here. That in the last few minutes she had clutched in her tiny hands the leadership of this band of men on Pluto. That not

all their brains combined could equal hers. That she held mastery over things they had not even thought about. She had thought, she said, for almost a thousand years.

How long did the ordinary man have to devote to thought? A normal lifetime of useful, skilled, well-directed adult effort did not extend much beyond fifty years. One third of that wasted in sleep, one sixth spent in eating and relaxation. Leaving only a mere twenty-five years to think—to figure out things. And then one died, and all his thoughts were lost. Embryonic thoughts that might, in just a few more years, have sprouted into well-rounded theory. Left for someone else to discover if he could—and probably lost forever.

But Caroline Martin had thought for forty lifetimes, thought with the sharp, quick brain of youth, without interruption or disturbance. She might have spent a year, or a hundred years on one problem had she wished.

He shivered as he thought of it. No one could even vaguely imagine what she knew—what keys she had found away out there in the dark of interplanetary space. And—she had started with the knowledge of that secret of immense power she had refused to reveal.

SHE WAS talking again, her words crisp and clipped, totally unlike the delightful companion she could be.

"You see, I am interested in time and space, always have been. The weapon that I discovered and refused to turn over to the military board during the Jovian war was your geosector . . . but with a vast difference in one respect."

"You discovered the geosector, the principle of driving a ship by space warp, a thousand years ago?" asked Kingsley.

She nodded. "Except that they wouldn't have used it for driving ships—not then. For Jupiter was winning, and everyone was desperate. They

didn't care how a ship was driven; what they wanted was a weapon."

"The geosector is no weapon," Kingsley declared flatly. "You couldn't use it near a planetary body."

"But consider this," said the girl. "If you could control the space warp created by the geosector, and if the geosector would warp time as well as space, then it would be a weapon, wouldn't it?"

Herb whistled. "I'd say it'd be a weapon," he said, "and how!"

"They wanted to train it on Jupiter," Caroline explained. "It would have blasted the planet into nothingness. It would have scattered it not only through space, but through time as well!"

"But think of what it would have done to the Solar System," ejaculated Kingsley. "Even if the warp hadn't distorted space throughout the whole system, the removal of Jupiter would have caused all the planets to shift their orbits. There would have been a new deal in the Solar System. Some of the planets would have broken up, some of them might have been thrown into the Sun. There most certainly would have been earthquakes and tidal waves and tremendous volcanic action on the Earth."

The girl nodded.

"That's why I wouldn't turn it over to them. I told them it would destroy the System. They adjudged me a traitor and condemned me to space."

"Why," said Gary, "you were nine centuries ahead of all of them! The first workable geosector wasn't built until a hundred years ago."

Nine hundred years ahead to start with, and a thousand years to improve upon that start! Gary wondered if she wasn't laughing at them. If she might not be able to laugh at even the Cosmic Engineers. Those geosectors out on the *Space Pup* must have seemed like simple toys to her. He remembered how he had almost bragged about them, and felt his ears go red and hot.

"Young lady," rumbled Kingsley, "it seems to me that you don't need any help from these Cosmic Engineers."

She laughed at him, a tinkling laugh like the chime of silver bells. "But I do," she said.

The red light blinked and she picked up the helmet once again. Excitedly the others watched her. Watched the poised pencil drop to the pad and race across the smooth white paper, making symbolic marks, setting up equations.

"The instructions," Kingsley whispered, but Gary frowned at him so fiercely that he lapsed into shuffling silence, his great hands twisting at his side, his massive head bent forward.

The red light blinked out and Caroline snapped on the sending unit and once again the room was filled with the mighty voice of surging power and flickering blue shadows danced along the walls.

GARY'S HEAD swam at the thought of it. That slim wisp of a girl talking across millions of light-years of space, talking with things that dwelt out on the rim of the expanding universe. Talking and understanding . . . but not perfectly understanding perhaps, for she seemed to be asking questions, something about equations. The tip of the pencil hovered over the pad as her eyes followed along the symbols.

The hum died in the room, and the blue shadows wavered in the white light of the fluorescent tube-lights. The red light atop the thought machine was winking.

The pencil made correction, added notes, and jotted down new equations. Never once hesitating. And then the light blinked out and Caroline was taking the helmet from her head.

Kingsley strode across the room and picked up the pad. He stood for long minutes, staring at it, the pucker of amazement and bafflement growing on his face.

He looked questioningly at the girl.

"Do you understand this?" he rasped.

She nodded blithely.

He flung down the pad. "There's only one other person in the system who could," he said. "Only one person who even remotely could come anywhere near knowing what it's all about. That's Dr. Konrad Fairbanks, and he's in an insane asylum back on Earth."

"Sure," yelled Herb, "he's the guy that invented three-way ten-man chess. I took a picture of him once."

They disregarded Herb. All of them were looking at Caroline.

"I understand it well enough to start," she said. "I probably will have to talk with them from time to time to get certain things straightened out. But we can do that when the time comes."

"Those equations," said Kingsley, "represent advanced mathematics of the fourth dimension. They take into consideration conditions of stress and strain and angular conditions which no one yet ever has been able to fathom."

"Probably," Caroline suggested, "the Engineers live on a large and massive world. A world where space is distorted, where stress and strain such as you speak of would be the normal things. Beings living on such a world soon solve the intricacies of dimensional space. On a world that large, gravity would distort space. Plane geometry probably never could be developed, because there'd be no such a thing as a plane surface."

"What do they want us to do?" asked Tommy Evans.

"They want us to build a machine," said Caroline. "A machine that will serve as an anchor post for one end of a space-time contortion. The other end will be on the world of the Engineers. Between those two machines, or anchor posts, will be built up a short-cut through the millions of light-years that separate us from them."

She glanced at Kingsley. "We'll need

strong materials," she said. "Stronger than anything we know of in the System. Something that will stand up under the strain of millions of light-years of distorted space."

Kingsley wrinkled his brow.

"I was thinking of a suspended electron-whirl," she said. "Have you experimented with it here?"

Kingsley nodded. "We've stilled the electron-whirl," he said. "Our cold laboratories offer an ideal condition for that kind of work. But that won't do us any good. I can suspend all electronic motion, stop the electrons dead in their tracks, but to keep them that way they have to be kept at close to absolute zero. The least heat, and they overcome inertia, start up again. Anything you built of them would dissolve as soon as it heated up, even a few degrees.

"If we *could* crystallize the atomic system," he declared, "we'd have a material which would be phenomenally rigid. It would defy any force to break it down."

"We can do it," Caroline said. "We can create a special space condition that will lock the electrons in their place."

Kingsley snorted. "Say," he said, "is there anything you can't do with space?"

Caroline laughed. "A lot of things I can't do, doctor," she told him. "A few things I can do. I was interested in space. That's how I happened to discover the space-time warp principle. I thought about space out there in the shell. I tried to figure out how to control it. It was something to while away the time."

DR. KINGSLEY glanced around the room, like a busy man ready to depart, looking to see if he had forgotten anything.

"Well," he rumbled, "what are we waiting for? Let's get to work."

"Now, wait a second," interrupted Gary. "Do we want to do this? Are we sure we aren't rushing into something we'll be sorry for? After all, all

we have to go on are those Voices. We're taking them on face value alone—and Voices don't have faces."

"Sure," piped up Herb, "how do we know they aren't kidding us? How do we know this isn't some sort of a cosmic joke? Maybe there's a fellow out there somewhere laughing fit to kill at how he's got us all stirred up."

Kingsley's face filled with anger, but Caroline laughed.

"You look so serious, Gary," she declared.

"It's something to be serious about," Gary protested. "We are monkeying around with something that's entirely out of our line. Like a bunch of kids playing with TNT. We might set loose something we wouldn't be able to stop. Something might be using us to help it set up an easy way to get at the Solar System. We might just be pulling someone's chestnuts out of the fire."

"Gary," said Caroline softly, "if you had heard that Voice you wouldn't doubt. I know it's on the level. I know the Engineers are our friends. You see, it isn't a Voice, really—it's a thought. I know there's danger, and that we must help, do everything we can. There are other volunteers, you know, other people from other parts of the universe."

"How do you know?" asked Gary fiercely.

"I don't know how," she defended herself. "I just know. That's all. Intuition, perhaps, or maybe a background thought in the Engineer's mind that rode through with the message."

Gary looked around at the others. Tommy Evans was amused. Kingsley was angry. He looked at Herb.

"What the hell," said Herb. "Let's take a chance."

Just like that, thought Gary. A woman's intuition, the burning zeal of a scientist, the devil-may-care, adventure-some spirit of mankind. No reason, no logic—mere emotion. A throwback to the old days of chivalry.

Once a mad monk had stood before the crowds and shook a sword in air and shrieked invective against another faith, and, because of this, Christian armies, year after year, broke their strength against the walls of eastern cities.

Those were the Crusades.

This, too, was a crusade. A Cosmic Crusade. Men again answering the clarion call to arms. Man again taking up the sword on faith alone. Man pitting his puny strength, his little brain against great cosmic forces. Man—the damn fool—sticking his neck out.

Tommy Evans was shouting, excitedly: "I started out for Alpha Centauri and look where I'm going now!"

END OF PART I.

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UNKNOWN

A year ago, I took over *Astounding*, with a background of writing in the field. I knew the accepted code of things that were liked and things that weren't.

I did not believe in that code. "Science-fiction readers don't like fantasy. Don't print it!" I published *Wings of the Storm*, and you voted it to a high place in the magazine, with the comment, "This was a grand little yarn—but I don't like fantasy. Don't print it." I tried *The Dangerous Dimension*. Only the fact that it competed with the most remarkable article any science-fiction magazine has printed, *Language For Time-Travelers*, kept it from first place. And the comment was, "I don't like fantasy, but this was an excellent little story."

No, it isn't fantasy you dislike; it seems it has been the quality of the fantasy that you have read in the past that has made the very name anathema.

Today, *Astounding* is the unquestioned leader in science-fiction. February 10th, and the second Friday of every month thereafter, a new magazine will appear. **UNKNOWN. UNKNOWN** will be to fantasy what *Astounding* has made itself represent to science-fiction. It will offer fantasy of a quality so far different from that which has appeared in the past as to change your entire understanding of the term. Its format, size, entire technique will represent an advance over fantasy of the past as great as the advance science-fiction has made in ten years of struggle.

For this new magazine, UNKNOWN, is no sudden eruption, but the planned, carefully tested result of a year and more of experiment and consideration. In the past year I have learned much from you and from the *Analytical Laboratory*.

And fantasy is liked—when it's **good** fantasy.

So, gradually, the background has been laid, the shaping of the new magazine done. For three months I have been waiting, gathering material, making sure that the first issue of UNKNOWN would set a standard by which you could judge it.

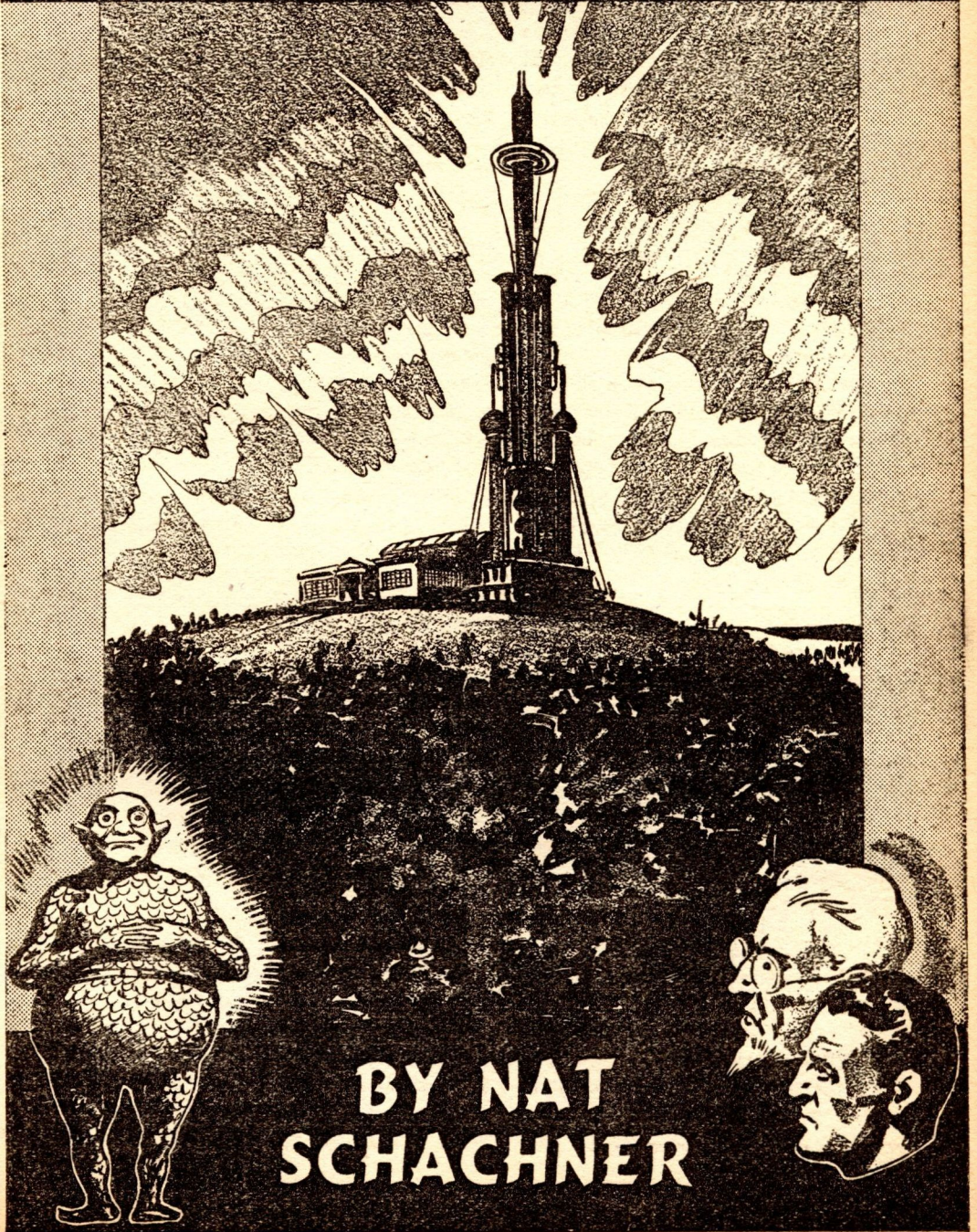
Now, I am ready. Outwardly, the new UNKNOWN will be a 160-page magazine—big as *Astounding* itself—with trimmed edges, selling at 20c a copy.

Inwardly, the first issue of UNKNOWN, the March issue, out February 10th, will contain a fifty-thousand-word novel by Eric Frank Russell, plus another forty thousand words of shorter stories. I can unhesitatingly say that this novel, *Sinister Barrier*, is the best piece of fantasy writing that has been done in the past 10 years. If you miss *Sinister Barrier*, you will genuinely have something to regret. It will be a classic referred to for another decade to come. To fantasy, I think it represents such an epoch-making story as did E. E. Smith's first *Skylark* story. It was the arrival of that story here in my office that finally started in motion the already-laid plans for UNKNOWN.

And I can assure you one does not start a new magazine because of the arrival of any one story alone!

John W. Campbell, Jr.
Editor.

PALOOKA FROM JUPITER



BY NAT
SCHACHNER

PALOOKA FROM JUPITER

*Our green, sun-warmed Earth—menaced by a
single man of Jupiter—*

IT was 5:45 p. m. on the northbound Lenox Avenue express, the very peak of the rush hour. Wearing stenographers clung to their straps, glaring with indignant intensity at equally wearied male bookkeepers who had pre-empted all the seats in the initial Wall Street sector and were now burying their noses in the sporting and comic sections of their newspapers, pretending not to see the aforesaid glares.

The train flung from side to side with the intensity of its homeward flight; the packed cattle within its stuffy confines flung obediently to the opposite side, in conformity with Newton's well-known First Law of Motion. It was hot; it was smelly; and tempers, already frayed by the day's work, hung on triggers.

A woman of rather definite obesity and the air of one who brooks no contradiction had managed to squeeze her bulk into a space where a knife blade might barely have been inserted. The meek little man on the right disappeared out of sight, completely overwhelmed by her bulging girth; the sweet young thing on the left essayed dulcet remonstrance.

"Some people," she said acidly, "have a noive. For the nickel they drop in the slot they think the whole subway belongs to them. If I was a fat old slob like some people—"

The intruder twisted her elephantine form. A faint smothering sound came from the submerged little man on her right. "Listen, you skinny little guttersnipe," she commenced venomously, "if I wasn't no lady, I'd—"

The train gave an extra-special lurch. The professorial-looking man with the thick-lensed glasses had chosen that par-

ticularly unpropitious moment to let go his strap in order to emphasize a point with a crooked forefinger to the young man who swayed on a companion strap at his side.

He lost his balance, fell with a plop into the lap of the irate woman. She suspended her academic discussion of what she would do if she were not unfortunately a lady, to devote her entire time and attention to this new disturber of her placid peace.

"Say-y-y!" she shrilled. "Where d'ya get that stuff? I ain't no couch for old billygoats who think just because this is a subway and I'm a lone, defenseless woman—"

Sampson T. Schley, internationally known scientist and heralded as the next winner of the Nobel Prize in Physics, scrambled most undignifiedly to his feet, clutched at his strap again with a death-like grip. His ears burned and his face suffused with blushes. Already necks were craning his way and snickers rose above the insistent grind of the wheels. Nor did it make matters better that Floyd Garrett, to whom he had been expounding at the very moment of the tragedy, the complex problem of the interstitial relations of two or more bodies coexistent in a simultaneous area, had a broad grin on his lean, sunburned young face.

"I . . . I'm extremely sorry, madam," he gasped hastily. "But the train rounded a curve, and my inertia, you know, in strict accordance with Newton's First Law of Motion, compelled me to—"

"Listen to him!" exclaimed the madam to the whole universe. "It ain't enough he makes a play for me, he

gotta add insults. Inoisha, hey? Where's a cop?"

"But, madam!" Schley started helplessly, and stopped short with a smothered gulp. Floyd Garrett broke off an amused chuckle, blinked furiously. Was he seeing things?

The outraged face of the lady had disappeared from view. Her paunch, heaving with a just wrath, was semi-obliterated. A man was sitting in her lap, grinning up at them with the benign, peaceful expression of one who was wholly unaware that he was perched on the very rim of a volcano.

FLOYD swore under his breath. He had not taken his eyes off the sputtering woman for even an instant. Schley had arched his body back as far as possible. There was a clear space in front of her. The train had not lurched, nor had the lights flickered from their steady glow.

Yet a man was sitting placidly in her lap, grinning up at him. He had materialized, so to speak, out of nowhere. Only a stir of wind, breathing freshly over Floyd's face, convinced him that he was not dreaming. A volume of air, equal in volume to the tangible bulk that had displaced it, had pushed outward. The man—

Floyd blinked again. Schley's blush of embarrassment had given way to a deathly pallor. The sweet young thing who had started the argument let out a shriek, and promptly fainted away. It was not a man—at least no such man as anyone in all that crowded train had ever seen before.

He was fat and solid and dark. In girth he billowed almost to the vast dimensions of the lady in whose embrace he had affectionately, if unaccountably, appeared. In height he lacked an inch or two of five feet. His nose was round and bulbous and glowed with a reddish phosphorescence. His eyes were equal saucers; there were no

lids to veil their fishlike intensity. His thickish lips were parted in a toothless grin. It was not that age had divested him of those indispensable adjuncts to humanity's happiness; there were no gums to prove that they had ever existed. His legs were decidedly curved and short; they dangled from their perch and missed the solid floor by inches.

His mountainous body was incased in a glittering, tight-fitting material of metallic-seeming scales, yet it gave with the softness and ease of silk to every movement of his limbs.

For one breathless moment the woman whose lap he had usurped sat rigid. Then anguished nature took its course. She let out a smothered scream. Her broad, red face, gasping for breath under the weight that crushed her down, appeared to one side. A stream of most unladylike imprecations poured from her lips.

"Get offa me, you soandso! Help! Ain't there any *gentlemen* in this here car?"

The strange figure in her lap remained calmly seated. Her cries, her unavailing struggles against the undoubted solidity of his weight, did not move him.

Ordinarily, Floyd Garrett was an extremely chivalrous young man. He went out of his way to rescue kittens from the ministrations of scatter-brained young dogs; he would dance with the oldest and plainest wallflower at university functions, to the vast discontent of all the young things who had come prepared to cut out and carry off in triumph the extremely good-looking young instructor in biology.

But now he had frozen to unmoving paralysis at the sight of this strange being who had plopped into the lady's lap.

Then it was that Sampson T. Schley rose to the heights. A strain of hidden gallantry welled to the surface. He forgot his own unfortunate *contretemps*; he forgot that the lady in question had accused him of unutterable things; he

overlooked even the bizarre features of the man. His eyes flashed behind their thick, obscuring lenses with noble indignation.

"Get off that lady," he sputtered. "You . . . you *cad!*"

The creature looked up at him. The grin widened. It was a pleasant grin—albeit toothless—it was even infectious.

"Why?" he demanded suddenly. "I find it quite comfortable here."

HIS ENGLISH was impeccable, yet grotesque. The syllables were all there, but the values were distorted; there were no accented beats; and—he lisped!

Professor Schley looked helplessly around. "Why?" he repeated. He was beyond his depth, floundering. "Because . . . uh . . . uh—"

Floyd repressed an irresistible desire to laugh. It was time to take a hand. But as he pressed forward, another passenger had already intervened. He was a burly brute, roughly clad, his mashed nose and cauliflower ears proclaiming the punch-drunk fighter.

"I'll tell yuh why!" he growled. "Youse foreigners oughta go back where yuh came from."

The stranger shifted his lidless gaze to his new interlocutor. "But I can't," he said mildly. "At least, not yet." He grinned engagingly. "You see," he explained, "I've come from the planet you call Jupiter. A silly name, I must confess. And I can't return until I've investigated your Earth and decided whether or not it is fit for colonization."

Floyd stiffened in his tracks. Schley nervously adjusted his glasses. This was madness, yet—

Then things happened too fast for them to intervene. A passenger began to laugh hysterically. The submerged little man came up for air, took one look at the Jovian, said, "Oh, Lord!" in a dying tone, and burrowed back out

of sight. The obese woman who was his unwilling cushion cried faintly: "Help! Get him off! He weighs a ton!"

The ex-fighter's face had darkened. "A wise guy, huh!" he snarled, and let go a solid roundhouse for the side of the stranger's head.

Floyd jerked forward. "Don't do that!" he exclaimed sharply. But it was too late. The swing was already connecting.

The Jovian had not stirred. He had not attempted to duck. But his face suffused with a reddish glow. His already fiery nose blazed into a strange incandescence.

The heavy fist, packed with a pile-driver wallop, bounced back as though from armor plate. Scarlet sparks flew in all directions. The clenched fingers seemed to disintegrate, to leave but a stump behind.

"Owww!" shrieked the fighter in an agony of pain.

Instantly the car was in a panic. There was a mad dash for the doors. Someone pulled the emergency cord. The train shuddered, strained, and came to an abrupt stop. Screaming men and women piled on each other in their terrified rush to get away. In seconds the car was cleared—except for the Jovian, the woman on whom he sat, Floyd, Professor Schley, and the prize fighter, who was staring foolishly at the stumps of his fingers.

Slowly the stranger heaved to his short, ludicrously curved feet. His grin seemed painted on. But there was nothing funny about him now to Floyd or to the others. The red glare that enveloped him died down.

"I do not like to be hit," he explained unnecessarily. "In Baridu—or Jupiter, as you call it—such things are not done. They are considered dreadful insults. As for the woman," he turned with courteous gesture, "I am sorry. I did not realize that perhaps my weight

might smother her. But she was so comfortable," he sighed.

SHE DID NOT hear. She was gone, pawing with screeching terror over the backs of the passengers who were unlucky enough to have been in her way. And after her, with a sudden howl, went the maimed prize fighter.

Lloyd said warily. "Did you . . . uh . . . mean what you just said?"

The creature nodded in some surprise. "Of course. We Jovians never lie. We have no such word in our vocabulary."

"But where did you learn our tongue?"

He smiled happily. "I didn't. I don't know it even now." He noted their incredulous looks. "You see," he explained, "I carry a translator." He flipped back the silvery scales of the high neck of his garment. A mesh of tiny wires was woven inside. Around the rim ran a series of green concavities that looked very much like flat suction cups.

"I set up an extremely high oscillating current," he continued in that toneless lisp of his, "that has a particular affinity for the atmospheric waves caused by sound. A selective wall of vibration is erected against which both my speech and yours impinge. The current analyzes the speech waves into their universal constituents; synthesizes them immediately into the opposite speech. I am speaking in the tongue of Baridu, yet what filters through is the language to which you are accustomed. I hear your peculiar talk likewise in the purring syllables of my own planet. It is simple, is it not?" he finished with a toothless grin.

"Very!" said Dr. Schley in much bewilderment. "But come now, Mr. . . . uh—"

"Pilooki," said the other promptly.

"Palooka!" Lloyd muttered under his breath.

The Jovian's translator-beam was supersensitive. The creature's bulbous nose lit up like a lantern. He nodded vigorously. "That's it. Palooka!"

And so, until the end of his incredible stay, was the Jovian known to all and sundry. Fortunately, there was no Jovian counterpart or exact translation for this very expressive Earthian term.

But Dr. Schley did not even smile. It is doubtful whether he even knew that there was such a word in the great American slang. Besides, all his scientific curiosity had been aroused. "But come now, Mr. Palooka," he repeated in a tone of remonstrance, "how was it possible for you to have translated yourself through some four hundred million miles of space like . . . er . . . this?"

The Jovian smiled commiseratingly. His nose, always phosphorescent, glowed like a signal lantern when he smiled. "The principle is most elementary," he said. "We dissociate ourselves into our primal quanta states. These streams of pure energy are projected along a carefully plotted path in space to a focal point upon your planet. At the given focus, the quanta of energy interact and recapitulate the original pattern of our beings.

"Of course," he added apologetically, "the determination of the terminal focal point requires rather delicate calculation. A trifle too far, and I might have found myself taking shape within unyielding rock; a trifle short, and I would have catapulted down through your very thin atmosphere with unfortunate results. That was why there was but a single volunteer for the scouting expedition—myself!"

FLOYD'S jaw tightened. "And what," he demanded carefully, "is the object of your exploration on Earth?"

Palooka looked surprised. His face was open, filled with almost infantile candor. "Why, I thought I told you!" he exclaimed. "I am to determine if

this little planet of yours is fit for colonization by my people. You see, Baridu is all right as far as it goes, but it doesn't go far enough."

"Eh, what's that?" Schley ejaculated, blinking. "Jupiter is hundreds of times larger than Earth."

The Jovian shook his head as to a child. "In size, yes. But not in inhabitable area. For a moment I thought you were rather intelligent people, but I see I must explain the obvious."

"Of course we know Jupiter is a huge mass of liquid ammonia and mixed hydrocarbons," Floyd said indignantly. "In fact, we were wondering where the devil you could possibly live on such a planet."

Palooka's lidless eyes grew rounder. His bulbous nose lit up with a beacon shine. "Good!" he crowed. "You *do* know something. Baridu in fact is as you describe it. But within that shifting ocean a smaller world swims. A world about the size of yours, and warmed by interior fires. An atmosphere of radioactive gases surrounds the core, reddish-brown in color, and so charged electrically as to repel to a safe distance the floods of ammoniacal liquid that threaten always to overwhelm us."

"So *that* is the explanation of the Great Red Spot," breathed Schley in great excitement. "Wait until the next meeting of the Academy—"

"If Baridu is the same size as Earth," Floyd argued reasonably, "why look elsewhere?"

The Jovian sighed. His round face was ludicrously sorrowful. "We are a lazy folk," he said in mournful accents. "Our protective blanket of activated atmosphere requires constant vigilance. The surrounding oceans of the greater planet seek always to break through." He looked down at his squat, powerful body and his bowed legs with a comical expression. "The tremendous gravity holds us down. When we walk, we use up considerable energy. Work is a nec-

essary function of our existence."

He stared at them plaintively. "We do not like to work. We like to loll and take our ease. On Baridu we cannot. But here, on your slighter planet, with its lesser gravity, its unattended atmosphere, life would be easy, delightful." He stretched his arms with anticipatory sybaritic pleasure. "We used to gather round our scanners and observe the green peacefulness of your Earth with envious longing."

Dr. Schley gulped. "But what about the dignity of labor?" he exclaimed. "*We* work; all mankind works."

"I do not understand that phrase," Palooka replied. "There is nothing dignified about labor. It calls for strain and concentration; it takes up time that could be better employed in contemplation and the ecstasy of living. Hasn't your planet enough of natural resources to support you all with a minimum of work?"

"Yes," said Schley doubtfully.

"Then why must everyone toil?"

"It's our setup," Floyd explained. "There is enough to go around, but our system of distribution is badly adjusted. As a result, some have too much, and have that leisure which you extoll; others must work long and painfully for the little they get."

"You have given me an idea," the Jovian replied with a sage nod. "It was our intention, if I found your world suitable for our race, to remove painlessly its present inhabitants. But if they *like* to toil, and are already accustomed to do so for the benefit of others, why should we not permit them to labor for us? Thereby we should be content, and so would they."

HIS FACE lit up. "It is a most happy solution. I thank you both for this very welcome idea. You know," he said with confiding candor, "you will laugh at me when you hear this. But I really felt uncomfortable at the

thought that we would have to eliminate your race from the planet on which it had lived so long. Of course," his mouth rounded with distaste, "some of your people, like that idiot who tried to hit me, or that beautifully plump person who objected to my presence in her lap, are not exactly pleasant in type; but I like you two."

"Er . . . thanks," declared Schley in some agitation, "but—"

Floyd Garrett's face hardened. "So you think," he said tightly, "that we'd prefer to live on as slaves to your race rather than suffer what you euphemistically describe as elimination?"

Palooka was surprised. "Why not?" he demanded. "You work now. You tell me that for most of you the fruits of your toil accrue to others. What difference would it make if the race of Baridu were the recipients? We would see to it that the Earthians would not starve."

Floyd was appalled at such logic. "But our liberty—" he exclaimed. "We would no longer be free."

"Are you free now? Can you do as you please; can you stop this dignified labor of yours when you wish?" The Jovian rose to his bowed legs. "But enough of idle talk. This strange conveyance of yours is too confining. I wish to see the surface of your world. Take me there."

PALOOKA was a new sensation to a sensation-torn Earth. The World's Fair had just reopened in New York with another tremendous fanfare and Grover Whalen. England had delivered its one-hundred-and-fifty-sixth note to Messieurs Hitler and Mussolini, warning both of these gentlemen that if they did not cease and desist, they could expect to receive still another *billet-doux*. China lost ten pitched battles in a row—and was winning the war. Shirley Temple essayed Juliet to Bobby Breen's Romeo. Shakespeare turned over in his

grave, and Super-Colossal Pictures cleaned up ten million. In short, this planet had headaches enough of its own without the advent of the Jovian.

Grover Whalen at once made him an offer to appear in person at the Fair. Three competing brands of cigarettes clamored for his endorsement of their products. The tooth-paste people were disconsolate. Palooka had no teeth. One enterprising concern, however, began to advertise the merits of its particular concoction as a spread to protect phosphorescent noses against the alien glare of the sun, in anticipation of the Jovian invasion. Haile Selassie sent an emissary to discuss the possibility of regaining his Empire, on the basis of a legend that his people had originally migrated from Jupiter.

But nobody took Palooka's cheerfully announced intention of taking over Earth seriously. Nobody, that is, with the exception of Dr. Sampson T. Schley and Floyd Garrett.

They attended the Jovian everywhere. They showed him the face of the Earth, as he insisted. They took him in airplanes to the far places; they conducted him through factories and scientific establishments. They pointed with pride to their mighty cities and gigantic engines of warfare.

But Palooka refused to be impressed by the show they put on. He dismissed their most prized evidences of civilization and power with a shrug of his broad-beamed shoulders and a good-natured smile of amusement. They were toys, elementary in form and crude in technique. Earth's scientific knowledge was halting; and as for lethal weapons—*pouf!*

With seeming naïvete he permitted himself to be shot at with rifles, bombed with half-ton projectiles, immersed in poison gas, sprayed with shrapnel. But bullets did not penetrate nor gas smother him. The curious glow that lit his nose spread in reddish tints over

his entire body, incased him in an armor of interlocked vibrations from which everything rebounded in a shower of disintegrating sparks.

Floyd shook his head in dismay at the results of these secretly cherished tests. "Palooka isn't as naïve as he pretends," he told Dr. Schley in the privacy of their own room after a particularly vicious bombardment with sixteen-inch guns. "That's his way of proving to us that resistance to his race is hopeless; and that we'd better submit cheerfully and like it, if we know what's good for us."

The physicist scratched the tip of his nose thoughtfully. "You know, Floyd," he said, flushing, "while naturally I had hoped that at least one of our weapons might have penetrated those curious vibrations of his, and put an end to the possibility of our enslavement, nevertheless I felt a curious shrinking of the flesh every time a shell roared in his direction." He thrust back his head with a defiant gesture. "I . . . I sort of like Palooka."

"So do I," Floyd admitted. "He's a likable chap—good-humored, always smiling. And his scientific attainments are way beyond ours. He has nothing but the kindest feelings for our race. He says so, and I really believe him. According to his point of view, we'd be better off under the domination of Baridu than in our present parlous state. Claims they would teach us how to live in harmony; to produce with a minimum of labor ample supplies both for them and for ourselves."

"Damn it!" exploded Schley. "There's something in that, my boy. It sounds wrong and detestable—but is it? I was a bit ashamed of our own kind when he started to pick things apart. A lot of liberty there is in most of Europe and Asia today. Men slaughtered by the millions, women and children dying of hunger, ruthless dictatorships everywhere. Perhaps Palooka is right."

Floyd said grimly, harshly: "No, he is not. Liberty—the sense and dignity of freedom—is worth more than bread and butter, than long life and slothful ease. It is born of danger and suffering, but it lifts us above the brute. I'd rather die on my feet than live on my knees. Earth is in travail just now, yet there is always the chance to win back to peace and decency and the triumph of the human mind. Under the rule of Baridu, no matter how kindly or well-intentioned, we shall be condemned forever to a state of hopeless slavery from which it will be impossible to emerge."

Schley looked blank. "But what can we do? Palooka laughs at our weapons. In a short while he will have completed his survey. We know the results already. He is delighted with our planet. In fact, he should have returned to Jupiter already if it weren't for his essential laziness. He is enjoying himself so much he keeps on putting off the day of departure. But sooner or later he will go, and then—"

"He will return with his whole race to claim our planet as their own," Floyd finished. "I wish to God I knew how to stop him!"

MEANWHILE Palooka was enjoying himself thoroughly. Little, unexpected things to which Earthians were wholly indifferent, gave him the keenest pleasure. The soft green of grass, the warmth of the overhead sun, the bright, clear sparkle of snow crystals, the paintings of El Greco, the Adagio of Beethoven's Ninth Symphony—and above all, the sense of release from gravitational pull—these things all filled him with unutterable delight.

"Baridu," he told his Earthian friends, "is a gloomy place in comparison. Our vegetation is a dull red brown; our climate is a dead uniformity of ceaseless warmth; and we are not an artistic race."

He leaped high in the air and kicked his feet for the sheer joy of it. His muscles, inured to the tremendous pull of Jupiter, sent him soaring over their astonished heads. He seemed shod with Seven League boots when he went for a walk. They had to accompany him in an automobile to keep on even terms.

His antics were funny; his cavorting leaps and his curving legs churning vigorously in the air were irresistibly humorous. But somehow, neither Floyd nor Dr. Schley could laugh. Each spasm of delight for the good things of Earth meant but another driving nail in the coffin of Earth's liberties.

At first the governments had been inclined to scoff at his claims, but the tests with guns and bombs aroused them at length to the seriousness of the situation. Committees of scientists, of high officials of government, met in solemn conclave with the Jovian. Speeches were made to him, alternately cajoling and threatening.

He listened to both cajoleries and threats with the same eternal good humor. And to all arguments he interposed the same impregnable retorts. Firstly, the race of Baridu would be better off on Earth; secondly, the race of Earth would be better off under their genial rule than in its present state.

He made pointed references to the war in China, the holocaust in Spain. He spoke of conditions as he had observed them in Italy and Germany; he politely called England's attention to India; he merely mentioned to the Russian representative the number of political executions that had taken place in that country the previous year. He gently reminded the Americans of the millions on relief, the slums of their great cities, and the distress of the share-croppers in the South.

"I am sure, my friends," he would invariably murmur at the end, "you would all be infinitely happier under our benign rule."

The news of these convocations made headlines in that part of the world's press which was still free, and filtered in by subterranean channels to the people of those countries where the press was forbidden to publish such subversive accounts.

For, without question, the arguments of this solitary alien invader *were* subversive.

The oppressed people of many lands, the underprivileged everywhere, began to murmur. There was much truth in what this Jovian said, they whispered among themselves. He promised them but little work, and a plentiful supply of the world's goods. What more could they wish? Liberty? Freedom to govern themselves? Bah! Empty, meaningless words! A pitiful mockery to those who writhed in the grip of dictatorships. Slogans that did not fill the stomachs of those who lived in the depression-clouded democracies.

THE MURMURS and whispers grew in volume; they became threatening shouts. The rulers of Earth quaked in their shoes. Ineradicable hatred filled them for the bland, genial Jovian who was responsible. The dictators, distant from the scene, believed the whole thing to be a frameup. They accused the democracies of having put up a charlatan to overthrow their governments. Officially, they decried his pretense to Jovian parentage. He was but a sideshow freak, they sneered; a monster with agile muscles. Even his silly name was but the comic invention of American humor. The whole affair was ridiculous, they declared. And meanwhile they suppressed with ruthless venom the first rustlings of revolt in their own realms.

One day, about two months after he had appeared in a New York subway train, Palooka bounded into the laboratory of Dr. Schley. Floyd Garrett had just preceded him. There was much of

painful import he wanted to discuss. But the Jovian gave him no chance. His round, dark face with its glowing headlight of a nose was wreathed in grins. Throaty chuckles bubbled out from toothless mouth, came unimpeded through the translation-screen.

"Good news, my friends," he cried "Good news!"

Dr. Schley looked up quickly from the feed line he was tightening. Floyd Garrett pivoted around. A strange feeling of alarm clutched at his heart. "What," he demanded, "do you call good news?"

"I have received a message from the Council of Baridu. They were finally able to locate me on their search-beams. They wish me to return immediately and report."

Something whirred within Floyd; stopped. He heard as from a great distance Schley's gasp of dismay.

"And you are going?" he asked in a choked voice. Carefully, slowly, his hand slid into his pocket.

Palooka surveyed him in round-eyed surprise. "Why, of course!" he exclaimed. "My mission is ended."

It was hard, what Floyd was going to do. In spite of everything, he had developed in these two short months a considerable fondness for the merry Jovian. Yet it had to be done. The liberty of Earth depended on it. He had thought it out carefully during long hours of sleepless tossing. If he could catch the Jovian off guard—

His hand whipped out suddenly. He shot from the hip, emptying his automatic full in the face of the alien. Palooka would have no time to adjust his defensive screen—

The steel bullets bounced back as though they were made of rubber. Great red sparks flew outward, caught them on the rebound, disintegrated them into little puffs of smoke.

The gun dropped from Floyd's fingers. He was suddenly weary. His

last attempt to save Earth had failed. Pale, composed, he faced the Jovian. Without doubt the man from another planet, enraged at this sudden attempt upon his life, would blast him down. Well, it did not matter! Nothing mattered any more!

For once the eternal grin deserted Palooka's face. The scarlet vibrations gradually died away. He looked inscrutably at Floyd, at Dr. Schley. For a long moment no one spoke.

Floyd said quietly: "Go on, Palooka, kill me! What are you waiting for? I tried to kill you."

Slowly the Jovian raised his hand. Floyd braced himself against inevitable death. Dr. Schley cried out sharply. Then the hand dropped as slowly.

"I won't kill you," the man from Jupiter replied in toneless accents. "You both may go. I require this laboratory to set up my return apparatus."

"You might as well," Floyd cried passionately. "I'd rather die than live a slave to you and your kind, no matter how benevolent your rule. Take warning, Palooka, and put an end to me. Once I go out, I'll rouse the world to prevent your ever leaving this planet. We'll blast you out of existence if we can."

The Jovian's gaze was inscrutable. "Go!" he repeated.

Slowly, unwillingly, they went out.

THE NEWS they flung around the world brought sudden realization to millions who had secretly believed the whole episode to be a gigantic hoax. A wave of hysteria swept the peoples. The American government acted promptly. Troops were rushed to the laboratory of Dr. Schley, armed with the latest death-dealing equipment. Scientists, under the leadership of the dispossessed physicist, went into huddles and evolved strange new electrical barrages.

But the isolated laboratory, standing

on a little knoll outside the city of Washington, was impregnable.

It was completely inclosed in a transparent, tenuous play of light. Bombing squadrons roared overhead, dropping tons of detonite; great tanks crashed in vain against those immaterial surfaces; thousands of shells described screaming arcs through the flaming atmosphere. The fragile building remained intact, while Palooka could be seen through the unshattered windows calmly engaged in erecting a curious platform ringed in by shining tubular columns of steel.

The secretary of war, who had taken personal charge of operations, groaned in despair. "There is nothing we can do to stop him," he said bitterly.

"Yes, there is," Floyd snapped back. "We can rouse the peoples of the world to a sense of their future degradation. We can teach them to prefer death to slavery, now or hereafter. Let them descend upon this plain by the millions; let them prove to Palooka that they will die rather than lift a finger in toil for a master Jovian race; let them swear to lay Earth waste from end to end in one vast holocaust; and Palooka will see that the game is not worth the candle."

The secretary of war shook his head. "You can never rouse them to that extent, Garrett," he said. "Half of Earth's billions today live under dictatorships, under conditions far worse than any they might expect from the Jovians. They never fought for their freedom before."

"They will now," Floyd promised. "Their present slavery was sugar-coated with words; their future is a stark reality that even the most befuddled intellect can grasp."

His insistence won. The troops were called off. Only a strong guard remained to surround the laboratory; where, day by day, with strange slow-

ness, the Jovian could be seen pottering about his queer apparatus.

The air waves were opened to Floyd. His winged, passionate words hurtled out on a hundred different wave lengths. Interpreters translated them immediately into all the languages and dialects of humankind.

HIS SPEECHES were fiery to the point. "An alien race intends to make you slaves," he thundered. "You are alarmed, hysterical over the prospect. But you are slaves even now—slaves to the few who rule you with iron fists, slaves to your own selfishness and stupidity that do not permit you to enjoy in peace and plenty the abundant fruits of the earth. Show now that you are men, worthy of freedom—yes, ready to die for it, if need be—and perhaps we can still overwhelm the Jovian and prevent his return."

The dictators, the warlords of Europe and Asia, screamed out their wrath. Now more than ever, they were convinced that the whole affair was a plot to stir up revolution among their subjects. They tried to jam the air in order to prevent the subversive words from being heard, but the skill and resourcefulness of the American technicians battered down all interference.

Then they declared war upon the United States.

But their people had heard the propaganda. They mobilized with suspicious placidity. They obediently received their weapons. Then, in a single resistless wave, they flowed over their oppressors, obliterated them from view. Revolutionary governments, based on democratic principles, were hastily formed. That need to arm an army that might use those arms to revolt had ever menaced dictatorship.

"We are ready," they cried across the oceans. "Lead us against the Jovian. We are not afraid to die."

Night and day, by ship, by plane, by

submarine, by every manner and mode of conveyance, millions of armed men, of a myriad races, converged on Washington. In all their diverse eyes, once separated by mutual hatreds, there now gleamed a common mighty determination. Liberty, the brotherhood of Earth, were mere words no longer. They were realities that no alien, no matter how mighty in science and superior knowledge, could take away.

In another week, Washington and the vast tidal plains of the Potomac seethed with a resistless horde. A hundred million men chanted in unison: "We will die rather than yield to the alien."

And still Palooka could be seen by the watchful guards going calmly about his work, without haste, without seeming heed of the mighty events that were shaking the world outside to its very foundations.

"I can't understand him," declared Dr. Schley, puzzled. "He seems to be making little or no progress with that apparatus he is erecting. I'm only a rank amateur in science compared to him, and possessed of one tenth his physical strength, yet I could have had the whole thing assembled a week ago."

"Whatever the reason," Floyd retorted grimly, "it's giving us our last chance. If necessary, we'll throw millions of men against his power barricade. They'll die, yes; but in the dying they'll pave the way for the living to break through. I'm positive Palooka can't control unlimited energy. Sooner or later his supply must become exhausted."

Dr. Clyde turned from the window of their temporary headquarters. It commanded a view of his old laboratory. "It is too late," he said dully. "Palooka has completed his quanta disintegrator. He is already taking his position between the steel columns."

Floyd paled, then galvanized into action. "We move at once," he exclaimed, and hurtled for his loud-speaker system.

BUT AS HIS HAND reached for the switch, a voice broke into the room. The intonationless, lisping voice of Palooka.

"It is no use, friend Floyd," it said. "All your sacrifice, or the sacrifice of millions of your comrades, will not help. The power I tap for my defensive screens is unlimited. It comes from the magnetic beams that surge through space. And I am ready even now to take off for Baridu. But if you and Dr. Schley will come *alone* into this laboratory, I have something to say to you."

The voice ceased. The two men stared at each other in dismay. Then, without a word, they went out through the door, through the silent guard lines, walking with death in their hearts toward the impalpable shimmer of light.

Millions of curious eyes followed their steady progress, wondering, waiting. The light darkened as they came to it; lit up again as they penetrated.

They found Palooka serious and pale-faced within the circle of his quanta disruptors.

"I am glad you came," he said. "I wish to say goodbye. I am returning to my native Baridu; once more I shall see those of whom I am a part." A momentary grin illumined his features; died. "You were my friends, even though you tried your best to kill me."

"We loved you, Palooka," Floyd declared vehemently. "But even now, if we could, we would do our best to kill you." Something choked him, hurried his words. "For the first time in human history, man has achieved freedom and a sense of unity—when it is too late. Goodbye! And take this message to your people. They will find a barren planet when they come to colonize. We shall destroy and lay waste every fertile field, obliterate our forests, blow up our mines and factories. We shall perish in a single universal holocaust rather than live on as slaves to an alien folk."

The Jovian smiled gently. "That won't be necessary," he said. "Our people

of Baridu will never leave their present home to seek your alien planet."

"What!" The simultaneous exclamation burst from both the Earthmen's lips.

"I am reporting to my people," said Palooka with a grimace, "that Earth is not inhabitable by the men of Baridu. As they knew beforehand. Your atmosphere, for one thing, is too thin; the hideous, raw sunlight that beats with blinding fierceness upon your planet is insupportable to eyes accustomed, as ours, to soft pastel shades and modulated tones. Your gravitational pull is so weak that my muscles ache all over from lack of effort. I hate the interminable and particularly poisonous green that pervades every nook and cranny of your world. I shall be happy once more to feast my eyes on lovely browns and reds. Obviously, your world is pleasant to you because you were designed to live in it. Equally obviously, someone designed for a different kind of world would find it hideous. I assure you, it is."

"But—but—" Floyd stammered, "you said all along how glorious you found life on Earth as compared to Baridu."

Palooka grinned. "Sheer buncombe!" he avowed. "Every moment has been a torture to me. I couldn't wait for this day. Green and blue—green and blue! It's a wonder my eyes still function. Would you like to live on a world all crimson and violet?"

"Then why," demanded Dr. Schley, "didn't you go back at once instead of scaring the living daylight out of Earth?"

The Jovian's lidless eyes probed deep into their own. "I found," he murmured, "a people disunited, cooped up into artificial divisions, hating each other, killing. I am leaving a race united, strong in new-found understanding and mutual trust. A little session of unhappiness to a single being of Baridu did not matter."

He smiled. His hand moved downward. There was a flash of blinding light. The two men blinked, stared at the vacant platform.

Palooka was gone, and the complex machinery he had erected was crumbling before their eyes to a silting powder, incapable of examination or reconstruction.

Floyd said in awed tones. "He deliberately chose this method as the best means of uniting the peoples of Earth into a proud, free race. He purposely delayed until he saw that his work was accomplished. He was a great man; greater than any our race has even possessed.

Dr. Sampson T. Schley found it necessary to take off his glasses. They were misty. "Delayed!" said he, indignantly. "He *came* for that."

"Good old Palooka!" said Floyd fervently.

MAN CAN NOW TALK WITH GOD

Strange Phenomena Follow New Teaching

MOSCOW, Idaho.—A new and revolutionary religious Movement which teaches that man can now talk with God, is attracting world-wide attention to its founder, Dr. Frank B. Robinson of Moscow, Idaho. This new Teaching, which, in its first year went into 67 different countries, is accompanied by phenomenal results in human lives, which are considered by many to border on the miraculous.

"PSYCHIANA," this new psychological and scientific religion, teaches that God exists here and now on the earth as the most dynamic yet invisible Power the world can ever know. The world is awaiting a revelation of this Power. "It is absolutely possible," says Dr. Robinson, "for every normal human being to contact and use this Power to bring health, happiness, and abun-

dant success here and now, while living on this earth."

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ICE AGE AHEAD?

BY WILLY LEY

We know there was an ice age; we can guess there may be another. But—what is Earth's normal climate? This we now have is abnormally cold!

Illustrated by Willy Ley.

OF all the many ages of Earth's history there was none that seems to us as intriguing and as remarkable as the Great Ice Age, the comparatively short period immediately preceding our own still shorter one.

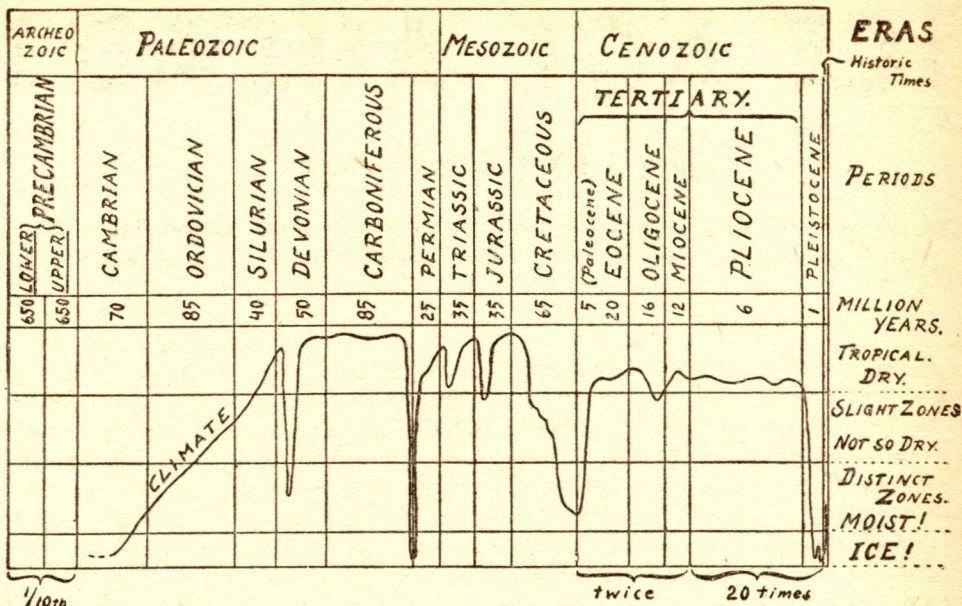
Oddly enough, it was the last geologic period to be definitely recognized in its true form. One might think that it ought to be much easier to trace the events of yesterday than those of yesterday, but scientists knew much about Jurassic and Cretaceous periods before they even dreamed of an Ice Age. True, climatic changes in the past, with more or less well-founded prophecies for similar changes in the future, had been occasionally surmised for a long time. But indisputable scientific proof was lacking until about sixty years ago.

In 1875 the German Geological Society was holding a convention in Berlin. Among the visiting foreign scientists there was a Swedish geologist by the name of Torell. Torell, eager to learn from his own observation something of the geology of the vicinity of Berlin, was making short trips during the daytime. One of these trips brought him to Rüdersdorf, one of the very few places in northern Germany where bed rock juts out from the eternal sands and clays that cover most of the country between the Hartz Mountains and the seashore. And in Rüdersdorf he found something none of his German colleagues who lived nearby had ever noticed! There were unmistakable

scratches on these rocks, scratches such as are produced only by the slow movement of a glacier that scrapes, with stones embedded in it, the ground over which it slowly flows.

The same night Dr. Torell reported before the Geological Society. What he said sounded the death knell for a theory advanced about forty years before by Sir Charles Lyell, known as the "drift theory" and reigning supreme for almost half a century.

North of the Hartz Mountains there is, as I said a short while ago, hardly anything but sand, marl and clay. But strewn over this sea of sand that would look like the Sahara Desert if not overgrown with pine forests or fields of rye, there are literally millions of pieces of rock, some weighing less than a pound but some attaining the ponderous weight of eighty tons or even more. The origin of these "pebbles" had always puzzled geologists, until Sir Charles Lyell had introduced his theory. The rock bore no resemblance at all to the mountains in southern Germany, only a few hundred miles distant. But grain for grain it matched the mountains of northern Scandinavia. Therefore, Sir Charles had supposed a sea covering most of Germany in the not-too-distant past, a sea on which large bergs drifted southward, coming from the glaciers of northern Scandinavia and carrying with them rocks from the mountains in the frozen North. Melting in the warm summer sun of Europe, the bergs dropped their



Coal forests in Antarctica, banana trees in New York—and semitropical foliage blossoming within the Arctic Circle! That situation is not abnormal heat, **but is Earth's normal climate.** Note on this graph that during vast periods of hundreds of millions of years Earth has been far warmer than today; that today the Earth is colder than at the worst of the Devonian Ice Age! And—note the expansion of the time-scale to show our brief present climate, the hair-line thinness of historic times, even when expanded.

burden of stone to the bottom of that presumably shallow sea that at the same time deposited all the sand.

Torell's discovery suggested very strongly that the drift theory had to be altered in one important respect. Instead of two hundred fathoms of water, one had to believe in several hundred yards (or even a mile) of ice, of glaciers stretching from Scandinavia all the way across the partly frozen North Sea and the completely frozen Baltic, covering the present sites of London, Brussels, Berlin and Warsaw.

The new conception met with some resistance, but in view of quickly accumulating additional evidence, it had to be accepted. It was on that day that not only the existence of a former glacial period was established, but also a new science founded—the science of paleoclimatology.

UP TO THE moment of Torell's momentous report, there had been little thought about climatic changes in the past. Occasionally it had been suggested by paleontologists that it might have been warmer in Europe in past geological periods. Goethe and a few of his closer friends had even discussed a period of increased cold once—it is interesting to note that one of these men, the mining inspector Voigt, had anticipated Lyell's drift theory by about fifteen years—but in general, geologists had treated the climate of geologic history as a moot point. They knew that land and sea had changed occasionally; they also knew from the efforts of fossil hunting paleontologists that fauna and flora had undergone several changes, but it seems that the thought of changing climatic conditions (other than those produced by the change of surroundings) simply

had not occurred to anyone with sufficient force to make itself felt.

Torell's discovery changed this peaceful outlook. At least one important climatic change had come some time ago. It was necessary to find out what had caused it. If the answer to this question had seemed an easy matter to some at first, they soon learned that it was not. The search for the causes of the Ice Ages proved about as difficult as the search for the north pole and although it did not actually cost human lives, it proved to be equally disastrous. The first thought, naturally, centered around the Gulf Stream. The climate of North America and of Asia, too, is much more severe in certain latitudes than in Europe, because neither America nor Asia benefits from the warm waters of the Caribbean Sea. If one supposed the existence of a wide and deep natural Panama Canal which made the Gulf Stream flow into the Pacific instead of the Atlantic, the puzzle seemed solved.

And then American geologists reported that they had found signs of a wide and deep glaciation in their own country, too. That ended the Gulf Stream hypothesis. And if anyone still clung to it, he was forced to abandon it as sufficient explanation when it became known that the south polar ice cap had also extended much farther at that time than it does now.

While a number of manufacturers of geological theories—only a few of them geologists by profession it may be added—were busily reshaping their ideas to fit the newly found facts, geologists could not close their eyes to a few more discoveries that tended to complicate the situation beyond words.

They found that there had been *more than one* Ice Age. I do not mean those interglacial periods that divide the Pleistocene Ice Age into four glaciations. Signs of entirely different and very remote Ice Ages were found, one during the Permian period, about two hundred

million years ago, and another one preceding even the Permian glaciation by another two hundred or two hundred and fifty million years!

While these finds admittedly made life difficult for some theorists, they had at least the advantage of knocking five dozen theories out so that it is not necessary to relate them any more as possible explanations. Most of them had tried to "explain away" the evidence found, in assuming long and complicated wanderings of the poles. It is obvious that a north pole resting where the British House of Lords is now standing would create a seemingly reliable, but in fact absolutely untrue picture of a general European glaciation. However, it could not account for a simultaneous glaciation on the west coast of America. While some of these theories were very ingenious, others showed all the signs of nightmares, bad dreams and head colds and could be discarded at a glance. But even the ingenious theories did not work.

The more theories had to yield before inconvenient but established facts, the clearer it became that every Ice Age had involved a general drop in climate. It was not very impressive as far as the number of degrees of temperature was concerned. Melchior Neumayr, one of the most brilliant geologists, had proven that a drop of only *six degrees* C. would be fully sufficient to create all the effects of a full-fledged glaciation. It only had to last for some time, a few hundred thousand years or so. Thus the question, in spite of all accompanying complications, became very simple. It could be compressed into one sentence, reading: "Why had the Earth gone through several fairly extensive periods during which the average temperature dropped by about 6° C. all over the planet?"

IF A ROOM is not warm enough, one naturally blames the stove. Evi-

dently there was something wrong with the Sun. Did the sunspots mean that it began to cool? One well known scientist, Dr. Eugen Dubois, the discoverer of *Pithecanthropus erectus*, believed that this question had to be answered in the affirmative. Knowing only about the interglacial periods of the Pleistocene, but ignorant of the glaciations during the Permian and the Cambrian periods, Dr. Dubois assumed that the Sun was actually weakening. Right now it had gathered some strength again, but still we were only living in another interglacial period in a pseudo-paradise from which the next glaciation would expel us permanently. Such pessimistic conclusions, coming from a man of Dr. Dubois' standing, sounded very grave. (Amusingly, this pessimistic theory was conceived and put on paper (in 1892) in the "Hell of Java," near Trinil, one of the hottest places on Earth.)

Along with many other theories, it was discarded when it became definitely known that two hundred, and again four hundred fifty millions of years before the latest Ice Age, other glaciations had taken place. These figures became a certainty when, after the discovery of radium and radioactivity, the duration of geologic periods could be actually measured. Geologists and paleontologists amassed astonishing amounts of knowledge during those four decades between 1870 and 1910. A multitude of observations allowed them to draw an impressive picture of what had taken place since the first life on Earth had appeared in the primeval oceans of the Lower Pre-cambrian period.

Much to the surprise of everybody, the climate proved to have performed strange antics. We do not know what it was in the beginning, but there is a fair chance that the customary pic-

RAW COURAGE!



Smashing his way to victory with great Bronze Fists, that's what is endearing this

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Carboniferous Period forest, a possible scene bringing together reconstructed plant and animal life such as might have grown in the vast swamps that characterized the entire Earth at the time. At a peak of warm climate, warmer even than Earth's normal average, life of every kind was surging up from warm seas to the warm continents—in a day when the Arctic Circle did not mean cold, but a climate warmer than New York of today!

ture of warm and steaming oceans under a heavy moisture-laden atmosphere is not far from the truth. But the first discernible climate proved to be, of all things, a veritable Ice Age, sometime during the Cambrian period. But it started climbing, possibly more abruptly than traced on the climatic curve on page 87 went through what we would consider "normal" to a condition that made Earth (climatically at least) a tropical paradise from Arctic to Antarctic Circle, provided that these two lines then existed. Then there was a sudden slump during the Devonian period, but it did not last long, and consisted mainly of creating a fleeting impression of climatic zones. But then,

when the swamp forests of the carboniferous period began to paint the formerly red planet Earth green, the climate had reached its peak and stayed there for about a hundred million years. Suddenly it dropped; to say that the bottom fell out is to put it mildly. The Permian period brought about a glaciation that almost froze Gondwanaland. Mutating amphibians and reptiles in desperation became warm-blooded first-mammals—these, while so very progressive during the Permian, were destined to remain nothing but poor, reactionary small fellows all through the next hundred million years. Triassic, Jurassic and Cretaceous periods were warm again—Gingko trees grew in

Grinnell Land, palmettos and laurel trees on Spitzbergen. It was a glorious time for reptiles, and every museum shows what they accomplished during their rule. Near the end of the Cretaceous period the average temperature suddenly dropped again; plant life changed, conditions became unbearable for the large herbivorous saurians and naturally the carnivorous reptiles disappeared along with them.

One is tempted to say that the saurians died out too hurriedly. It did not come to an actual glaciation; the following Tertiary period resumed the tropical splendor of the Mesozoic, and the mammals that had suffered reptilian domination for millions of years did their very best to repopulate the planet that was swept clean of enemies. But only fifty million years later the climate made another sudden dive, this time a real one into a full-grown Ice Age that finally brought Man to power, by either creating the knowledge of fire or emphasizing its usefulness.

I did not use the word "sudden" several times without reason when I spoke of climatic recessions. It has been learned but recently—say during the last twenty years—that the climatic changes in all probability did come suddenly. While the geologic periods have to be measured in millions of years, and the climatic depressions themselves at least by hundreds of thousands of years, the changes, i. e., the transitions, seem to have taken place in a much shorter time, say only twenty thousand years or thereabouts. Some geologists now talk openly of "mutating periods," adapting a term and a theory that has proved its fruitfulness in the allied field of biology.

A THEORY that tries to name a cause for all this has to meet with at least three general demands. Its cause has to be recurrent, but must not involve any regular periodicity. Second,

the cause must create a general cooling effect all over the planet, and third, it should work with a fair degree of suddenness.

A friend of mine, who was careless enough to deliver numerous lectures and to write profusely about glacial periods, once told me that the weight of manuscripts containing Ice Age explanations submitted to him had passed the fifty-pound mark. Soon, he said, the manuscripts will weigh as much as the printed books on the subject. "But," he added, "none is convincing. I'll have to continue adhering to Arrhenius."

Shortly afterward, however, another theory was advanced that explains the facts well enough to deserve mention. It originated on the desk of Professor Nölke in Bremen, an astronomer. He proved mathematically that all the observed facts *might* be explained very simply by passing through a cloud of cosmic dust. Such a cloud, if of sufficient, but not too high, a density, would screen off some of the Sun's rays without appreciably changing the orbits of the planets. The results are evident: less heat and more rain. Ice forming near the poles and on mountains during the cold seasons and not disappearing completely during the warm seasons, thus accumulating and forming glaciers.

You probably remember Bruno H. Bürgel's novel "The Cosmic Cloud," the English translation of which appeared in this country a number of years ago. I happen to know from personal contact with Bruno H. Bürgel, who is an astronomer himself, that he conceived and wrote the novel about three years before Professor Nölke introduced the theory in a scientific paper, without having read Bürgel's novel.

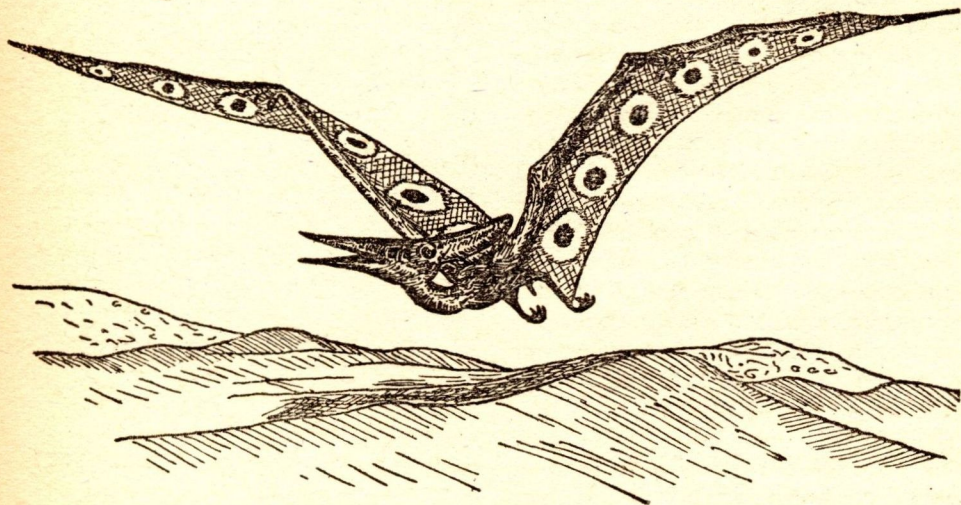
The only other theory that can still claim a *raison d'être* was advanced by the great Svante Arrhenius and presented to science in collaboration with

a geologist, Professor Frech. Arrhenius' theory is a general application of a few simple facts and shows what important changes can be produced by seemingly unimportant causes. The whole complicated problem was suddenly reduced to variations in the "hothouse effect" of the atmosphere. Aside from nitrogen and oxygen, our atmosphere contains about one percent of "rare gases," mainly argon, about 0.03 percent of carbon dioxide, and a varying amount of water vapor. The latter two are those that retain solar radiation and thus form a warm planetary blanket. If CO_2 were absent, most serious consequences would ensue. The complete removal of this apparently insignificant 0.03 percent of CO_2 would cause the average temperature to drop by 21°C . No Ice Age was ever so severe. And since such a drop would cause most of the water vapor to condense, the thermometer would go down for *another twenty or so degrees*—then Mars would be a warm planet by comparison.

It is evident that such a wide range

of variation would more than explain the actual variations that took place; they amount to not more than a third of what would happen if carbon dioxide alone disappeared, without even touching the atmospheric content of water vapor. It only remained to find causes for CO_2 variations and to see whether they fit chronologically.

This was the point where Professor Frech stepped in. That plants consume CO_2 and animals produce it, he said, is relatively unimportant; they about balance each other—especially since the oceans are always ready to absorb the gas. Changes could only be produced by volcanoes in one direction and by erosion in the other direction. Volcanoes produce CO_2 in quantities, while eroding mountains consume it in equally large quantities. Frech began to trace volcanic activities back through the ages and soon arrived at the conclusion that the facts did fit chronologically. There was not much volcanic activity during the Cambrian period, and what CO_2 was to be had was consumed by the oceans and by



Pteranodon ingens: They learned about flying from him! The largest flying animal that ever existed, the upper Cretaceous period saw him and his brethren flying over North American waters, catching fish on which he lived.

erosion. A decided low was the result, but slowly volcanism increased. Notwithstanding a short interruption during the Devonian period, the climate climbed to a first high level that made zones disappear. The planet was pleasantly warm even in high latitudes, but the Equator was not overheated because of the large quantities of water vapor in the air. Conditions were ideal when the Carboniferous period dawned. But new and large chains of mountains—eroding even while they grew—impossible quantities of plant life, and simultaneous complete cessation of volcanic CO₂ production, led to the Permian glaciation. Then the volcanoes resumed work—but you know all of this already.

Returning to the viewpoint of pessimistic Dubois of Pithecanthropus fame, we have to ask the important question now: What is going to happen in the future?

EVIDENTLY we are in such a transition period as followed every other great Ice Age. What is the result of this transition going to be? Obviously the chances for pessimism are slim. Having just emerged from an Ice Age, it is not very likely that it will come back. And the only two theories that survived all the rigors of geologic progress are both very optimistic in outlook. If Professor Nölke be right, we can say with certainty that no new Ice Age is approaching. Our big telescopes would show us any cosmic clouds we might be approaching. There seems to be none in our way for millions of years to come. Thus we may expect our climate to improve a little more, getting rid of the last remnants of the latest glacial period and settling back to normal—which means a little warmer than it is nowadays.

But if Arrhenius is right, chances are even better and more promising. The fiery gods of the deep are fairly

much alive right now, producing feats like Mt. Vesuvius, Katmai, Krakatoa, and Mount Pelée. Chances are that they will get worse—and thus better at the same time.

“Better” means of course the return of Tertiary glories and to forecast the future it is only necessary to look back.

A picture of the European countries during the Tertiary period—it so happens that many of these things are better known from European than from American finds—as it can be reconstructed from fossils, looks at first glance utterly confusing. That relatives of our elephants roamed near Vienna does not necessarily mean much; the mammoths of the actual Ice Age lived in that vicinity, too. But during the Tertiary period, hundreds and thousands of hippopotami enjoyed life and succulent lily pads in the River Thames or in another river then flowing there. I cannot truthfully say that I find the Thames to be tropical right now. But then, when I suffer during hot summer days in New York City I like to explain that I come from the amber country at the shores of the Baltic and that this is a cool country. But the very amber I used to hunt for when I was a boy proved that once a forest thrived at about 55° N. that was composed of several varieties of pines (they produced the amber) growing side by side not only with chestnuts, maples, beeches and oak trees but also with palmettos, magnolias, sequoias (the Redwoods of California), soap trees, sandalwood, laurels, cinnamon trees, smilax, flax, auphorbias, geraniums—it is a list reading like a guide-book of a botanical garden!

Nor was that the peak of Tertiary achievements.

Spitsbergen, under 78° N., boasted of pine trees, sequoias, swamp cypresses, poplars, elms, willows, beeches, oaks,



Dinotherium Giganteum, a giant elephantlike animal of the early Tertiary period. Interestingly, although nearly complete skeletons of these animals have made possible quite accurate restorations, no one has yet discovered the bones of the feet. Hence, accurate restorations of the feet are impossible at present—so all drawings of them show them as has Willy Ley; with the feet hidden!

walnut trees, lindens, maples, and magnolias (10° north of the Arctic Circle) of smaller plants, sedges, reeds, and iris. Grinnell Land, a part of Ellesmere Land north of America, had practically the same flora; the differences are so small that one might expect to find fossils of the mutually missing plants sooner or later. Northern Greenland, at about 70° N., had in addition to those plants thriving under 80° N., another and more luxuriant variety of magnolias, it had sassafras and ginkgo and seven varieties of oaks with beautiful large leaves, a chestnut tree and grapevines! With modifications, all this holds true, too, for Iceland, Sakhalin, Kamtchatka and Alaska, the modifications being a closer approximation to subtropical Europe.

To grow nowadays in France, Ger-

many, and England what grew there during the Tertiary period would necessitate an increase of the average all-year-round temperature by $9-10^{\circ}$ C. For Spitsbergen, the average would have to be raised by $18-20^{\circ}$ C; for Greenland about 20° , and for Grinnell Land even 28° C. Switzerland would need 9° more; the countries bordering the Mediterranean something like 5° ; northern Africa only $1-2^{\circ}$. It is evident how climatic zones faded and disappeared during the Tertiary period.

There is hardly need to cite examples of the fauna, too. Tropical coral reefs grew at $40-45^{\circ}$ N.—the latitude of Nova Scotia. Tapirs, okapis and secretary birds lived in the palm-tree forests around Paris, and coconut trees grew all along the Rhine, sheltering a fauna of the same character, although

not composed of exactly the same varieties, as is typical for Java and Sumatra in our time. During the Jurassic, the average was probably even a bit higher, but not much.

All this, according to Arrhenius, is bound to come again. We—or our children's children—shall be able to harvest pineapple, bananas and bread fruit in the Rhine Valley, mangos and citrus fruits in Maine, and drink wine of the "Greenland Bodega" brand (sweet and heavy) or "Spitsbergen Ratskeller Extra-Dry." That plants so far up north—it must for many reasons be assumed that the poles always occupied approximately their present position and location—have to endure a dark period did puzzle scientists for a while. But there is really no reason why they should not be able to adapt themselves to such a condition. The comparatively gigantic leaves of many fossil plants from those latitudes prove that they well utilized at least the twilight periods.

IF THESE FACTS and theories had been brought to the attention of learned and distinguished savants a few centuries ago, they would probably have received them in silence, spun philosophical thoughts around them, and have hoped for the best for their progeny. Our reaction is somewhat different. It explodes into the question: "And if the carbon dioxide does not mount up as we want it to, what can we do about it?"

Svante Arrhenius himself furnished a partial answer in writing: "The CO₂ content of the air is so small that the yearly consumption of coal which amounts now (in 1910) to about eleven hundred million tons, and which is increasing rapidly, supplies about one-six-hundredth of the amount present in the atmosphere. And also the oceans tend to regulate it. . . . It is evident that the CO₂ content will be changed

noticeably by industrial activities in the course of a few centuries."*

When Arrhenius wrote this he did not know that only a few decades later man would consider the burning of coal for heat (industrial and otherwise) as a shameful waste. Once after a lecture of Arrhenius' theories, a gentleman from the audience came to me and told me that this aspect of Arrhenius' theory is going to be obsolete very shortly. The age of electricity, he said, does not burn coal any more. Right, perhaps, but it does produce CO₂ just the same. Whether coal is burned directly or cracked first and then utilized, whether cars and airplanes run on gasoline, fuel oil or alcohol does not matter, carbon dioxide is always the final result.

To produce carbon dioxide by burning, just for the sake of improving the

* While it is comparatively easy to estimate the amount of CO₂ produced by industrial and other human activities, the amount of carbon dioxide produced by the volcanoes is difficult to compute. None of the geological reports contains reliable figures, but it is known that some volcanoes ejected immense quantities of solid matter. Rakata on Krakatoa, for example, ejected in August 1883 one cubic mile of solid matter; Papandayang on Java in 1772 about one and one half cubic miles; Tomboro on Sumbawa in 1815 and Skaptar Jökull (Varmárdalur) on Iceland in 1783 each about as much as Papandayang. The amount of gaseous matter ejected was anywhere from five to fifty times as large. One of the three Krakatoa volcanoes, for example, furiously blew water vapor and carbon dioxide from an aperture one hundred and fifty feet in diameter from May 20, 1883, till August 26th, the date of the actual eruption, as though it were compressed air escaping from a pipe. One of the Iceland volcanoes is estimated to have ejected about half a cubic mile of gases—mainly water vapor and CO₂—every day for several weeks.

There are now about three hundred and fifty active volcanoes known, and the same number of "extinct" volcanoes likely to resume activity at any time. This number does not include those regarded as permanently extinct; it also does not include the numerous mofettas, fumaroli, soffioni, geysirs, gas volcanoes and the "mare" of western Germany that produce steadily almost pure CO₂. Extensive fields of such gas wells are known in Alaska, Java, Hungary and parts of Germany.

While there is no agreement as to the amounts consumed annually by plants (Prof. H. Schroeder of Kiel estimates the amount as fifty-nine billion tons of CO₂ or sixteen billion tons of carbon) everybody agrees that practically all of it returns into the atmosphere when the plant dies. The losses of plant fertilization are at present very small, hardly ten percent of industrial production. The fact that the seas still absorb CO₂ is regarded by some as proof that the atmospheric content of this gas is increasing; otherwise, they say, a balance would have established itself long ago. I should add that the seas are likely to release CO₂ if the temperature increases.

climate is, of course, absurd. In discussions of Arrhenius' theory I have been asked whether it would help to burn all the primeval forest of the Congo and Amazon River districts. Not only that carbon dioxide would thus be produced, but it would also cut down on "useless" consumption. While there are reasonable doubts that these damp forests could be burned at all, it would also be unwise to do so; the climatic changes thus provoked might be anything but an improvement.

However, if direct influence seems unlikely because of the magnitude of the task, it might prove possible to excite the needed natural forces. Why not stir up volcanic activity if it threatens to go to sleep behind our backs and thin the atmospheric blanket? Already those experiments to utilize volcanic heat for power release carbon dioxide into the atmosphere that would have remained underground if man had not interfered. It is also conceivable that carbon dioxide wells may be drilled, just as natural steam wells are being drilled now in Italy. The industrial point of view would probably cen-

ter upon the manufacture of "dry ice," but since this "dry ice" sooner or later evaporates when being used for cooling, it finally finds its way into the atmosphere to do some additional duty.

Volcanic research, after having progressed further, will probably be able to show how isolated volcanoes might be made to serve humanity. The famous catastrophe of Mount Rakata on the island of Krakatoa in August, 1883, may give a clue. When sea water found its way to the interior of the volcano it exploded *most* violently, shooting close to a cubic mile of stones into the air and several hundred times that amount of carbon dioxide and water vapor. Geologists will some day be able to tell where a few tons of explosive will do the most good in sleeping volcanoes.

Only a few decades ago thoughts like these would have been utterly fantastic and preposterous. But so were very many other things. We now control, or at least try to, chemical reactions, rivers, tides, and the mutation of our domestic animals.

So why not our climate, too?

"AH, BUT YOU'RE WRONG!"

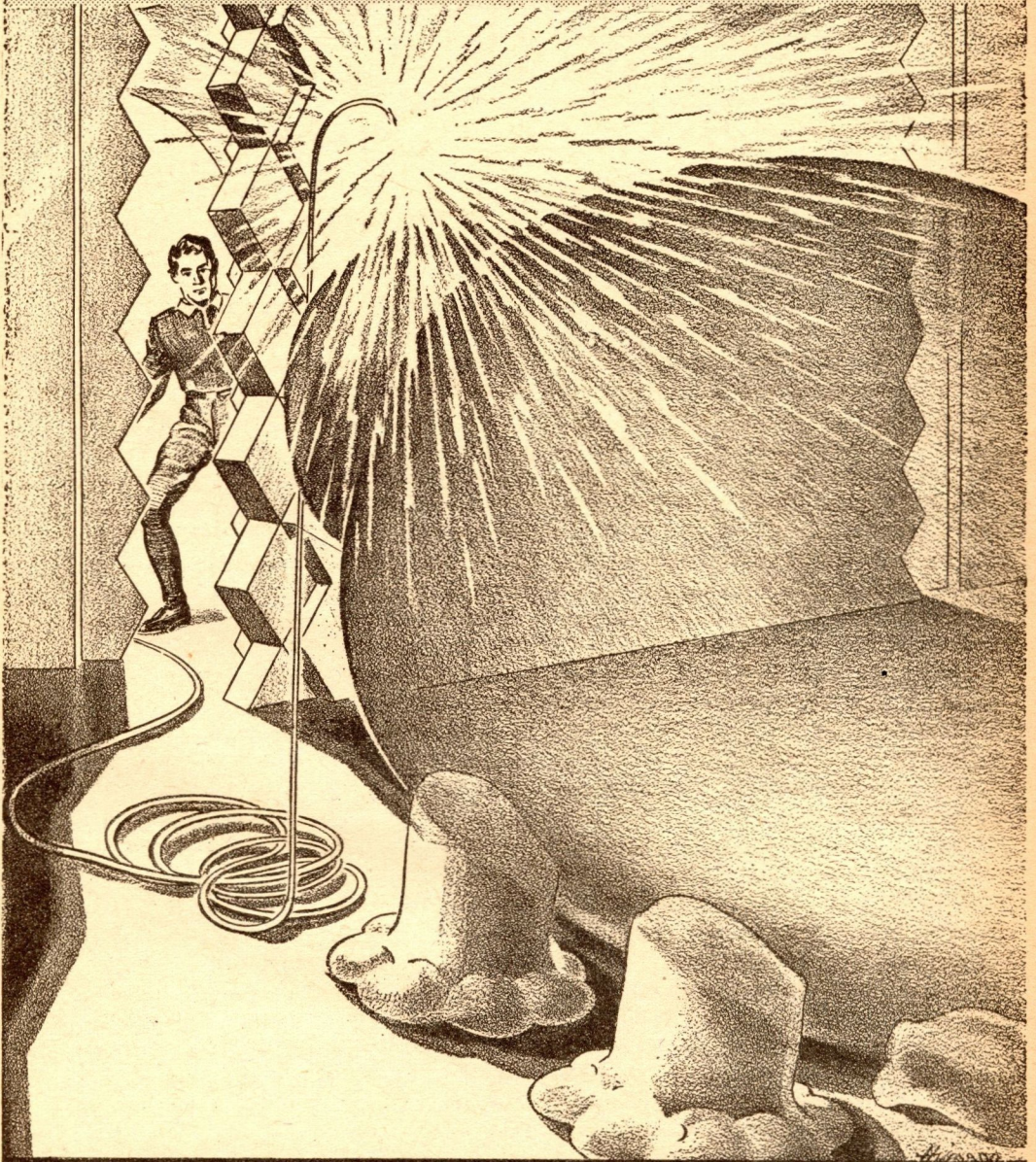
AS most good science-fictionists know, no material particle can equal or exceed the velocity of light, according to Einstein's calculations. It is of interest, then, to read that material particles—in this case, electrons—have exceeded the velocity of light, and exceeded it very materially.

In fact, scientists are now engaged in a study of the strange bluish-white radiation given off from these super-velocity electrons. Most interesting, perhaps, is the fact that almost any junior physicist or chemist should be able to think out how this apparent violation of the "no faster than light" speed limit is possible.

The contradiction becomes clear when you take into consideration the meaning of the index of refraction. Light, entering glass, is bent from its course, due to the fact that *velocity of light in glass is lower than in empty space*. In carbon disulphide, or a number of other carboniferous liquids, the speed of light is very much lower; it drops below one hundred thousand miles per second in some cases. It's no trick, then, to make a cathode ray tube shoot electrons into such a low-light-velocity liquid at a speed *greater* than the velocity of light.

The resulting bluish-white radiance, known as *Cerenkov radiation*, is still very much of a mystery—light arising from the passage of a material particle traveling faster than light itself!—*Arthur McCann*.

"NOTHING HAPPENS ON THE MOON"



BY PAUL ERNST

“NOTHING HAPPENS ON THE MOON”

—that is, nothing you could see— But it did explain some of the madness that afflicted lonely men on other planets.

THE shining ball of the full Earth floated like a smooth pearl between two vast, angular mountains. The full Earth. Another month had ticked by.

Clow Hartigan turned from the port-hole beside the small air lock to the Bliss radio transmitter.

“RC3, RC3, RC3,” he droned out.

There was no answer. Stacey, up in New York, always took his time about answering the RC3 signal, confound it! But then, why shouldn't he? There was never anything of importance to listen to from Station RC3. Nothing of any significance ever happened on the Moon.

Hartigan stared unseeingly at the pink cover of a six-month-old *Radio Gazette*, pasted to the wall over the control board. A pulchritudinous brunette stared archly back at him over a plump shoulder that was only one of many large nude areas.

“RC3, RC3—”

Ah, there Stacey was, the pompous little busybody.

“Hartigan talking. Monthly report.”

“Go ahead, Hartigan.”

A hurried, fussy voice. Calls of real import waited for Stacey; calls from Venus and Jupiter and Mars. Hurry up, Moon, and report that nothing has happened, as usual.

Hartigan proceeded to do so.

“Lunar conditions the same. No ships have put in, or have reported themselves as being in distress. The hangar is in good shape, with no leaks. Nothing out of the way has occurred.”

“Right,” said Stacey pompously. “Supplies?”

“You might send up a blonde,” said Hartigan.

“Be serious. Need anything?”

“No.” Hartigan's eyes brooded. “How's everything in Little Old New York?”

Stacey's businesslike voice was a reproof. Also it was a pain in the neck.

“Sorry. Can't gossip. Things pretty busy around here. If you need anything, let me know.”

The burr of power went dead. Hartigan cursed with monotony, and got up.

Clow Hartigan was a big young man with sand-red hair and slightly bitter blue eyes. He was representative of the type United Spaceways sent to such isolated emergency landing stations as the Moon.

There were half a dozen such emergency landing domes, visited only by supply ships, exporting nothing, but ready in case some passenger liner was crippled by a meteor or by mechanical trouble. The two worst on the Spaceways list were the insulated hell on Mercury, and this great, lonely hangar on the Moon. To them Spaceways sent the pick of their probation executives. Big men. Powerful men. Young men. (Also men who were unlucky enough not to have an old family friend or an uncle on the board of directors who could swing a soft berth for them.) Spaceways did not keep them there long. Men killed themselves, or went mad and began inconsiderately smashing expensive equipment, after too long

a dose of such loneliness as that of the Moon.

Hartigan went back to the porthole beside the small air lock. As he went, he talked to himself, as men do when they have been too long away from their own kind.

"I wish I'd brought a dog up here, or a cat. I wish there'd be an attempted raid. Anything at all. If only something would *happen*."

Resentfully he stared out at the photographic, black-and-white lunar landscape, lighted coldly by the full Earth. From that his eye went to the deep black of the heavens. Then his heart gave a jump. There was a faint light up there where no light was supposed to be.

HE HURRIED to the telescope and studied it. A space liner, and a big one! Out of its course, no matter where it was bound, or it couldn't have been seen from the Moon with the naked eye. Was it limping in here to the emergency landing for repairs?

"I don't wish them any bad luck," muttered Hartigan, "but I hope they've burned out a rocket tube."

Soon his heart sank, however. The liner soared over the landing dome a hundred miles up, and went serenely on its way. In a short time its light faded in distance. Probably it was one of the luxurious around-the-solar-system ships, passing close to the Moon to give the sightseers an intimate glimpse of it, but not stopping because there was absolutely nothing of interest there.

"Nothing *ever* happens in this God-forsaken hole," Hartigan gritted.

Impatiently he took his space suit down from the rack. Impatiently he stepped into the bulky, flexible metal thing and clamped down the headpiece. Nothing else to do. He'd take a walk. The red beam of the radio control board would summon him back to the hangar if for any reason anyone tried to raise RC3.

He let himself out through the double wall of the small air lock and set out with easy, fifteen-foot strides toward a nearby cliff on the brink of which it was sometimes his habit to sit and think nasty thoughts of the men who ran Spaceways and maintained places like RC3.

Between the hangar and the cliff was a wide expanse of gray lava ash, a sort of small lake of the stuff, feathery fine. Hartigan did not know how deep it might be. He did know that a man could probably sink down in it so far that he would never be able to burrow out again.

He turned to skirt the lava ash, but paused a moment before proceeding.

Behind him loomed the enormous half globe of the hangar, like a phosphorescent mushroom in the blackness. One section of the half globe was flattened; and here were the gigantic inner and outer portals where a liner's rocket-propelled life shells could enter the dome. The great doors of this, the main air lock, reared halfway to the top of the hangar, and weighed several hundred tons apiece.

Before him was the face of the Moon: sharp angles of rock; jagged, tremendous mountains; sheer, deep craters; all picked out in black and white from the reflected light of Earth.

A desolate prospect. . . . Hartigan started on.

The ash beside him suddenly seemed to explode, soundlessly but with great violence. It spouted up like a geyser to a distance of a hundred feet, hung for an instant over him in a spreading cloud, then quickly began to settle.

A meteor! Must have been a fair-sized one to have made such a splash in the volcanic dust.

"Close call," muttered Hartigan, voice sepulchral in his helmet. "A little nearer and they'd be sending a new man to the lunar emergency dome."

But he only grimaced and went on.

Meteors were like the lightning back on Earth. Either they hit you or they missed. There was no warning till after they struck; then it was too late to do anything about it.

Hartigan stumbled over something in the cloud of ash that was sifting down around him. Looking down, he saw a smooth, round object, black-hot, about as big as his head.

"The meteor," he observed. "Must have hit a slanting surface at the bottom of the ash heap and ricocheted up and out here. I wonder—"

He stooped clumsily toward it. His right "hand," which was a heavy pincer arrangement terminating the right sleeve of his suit, went out, then his left, and with some difficulty he picked the thing up. Now and then a meteor held splashes of precious metals. Sometimes one was picked up that yielded several hundred dollars' worth of platinum or iridium. A little occasional gravy with which the emergency-landing exiles could buy amusement when they got back home.

Through the annoying shower of ash he could see dimly the light of the hangar. He started back, to get out of his suit and analyze the meteor for possible value.

It was the oddest-looking thing he had ever seen come out of the heavens. In the first place, its shape was remarkable. It was perfectly round, instead of being irregular as were most meteors.

"Like an old-fashioned cannon ball," Hartigan mused, bending over it on a workbench. "Or an egg—"

Eyebrows raised whimsically, he played with the idea.

"Jupiter! What an egg it would be! A hundred and twenty pounds if it's an ounce, and it smacked the Moon like a bullet without even cracking! I wouldn't want it poached for breakfast."

The next thing to catch his attention was the projectile's odd color, or, rather, the odd way in which the color seemed

to be changing. It had been dull, black-hot, when Hartigan brought it in. It was now a dark green, and was getting lighter swiftly as it cooled!

THE BIG CLOCK struck a mellow note. Time for the dome keeper to make his daily inspection of the main doors.

Reluctantly Hartigan left the odd meteor, which was now as green as grass and actually seemed to be growing transparent, and walked toward the big air lock.

He switched on the radio power unit. There was no power plant of any kind in the hangar; all power was broadcast by the Spaceways central station. He reached for the contact switch which poured the invisible Niagara of power into the motors that moved the ponderous doors.

Cr-r-rack!

Like a cannon shot the sound split the air in the huge metal dome, echoing from wall to wall, to die at last in a muffled rumbling.

White-faced, Hartigan was running long before the echoes died away. He ran toward the workbench he had recently quitted. The sound seemed to have come from near there. His thought was that the hangar had been crashed by a meteor larger than its cunningly braced beams, tough metal sheath, and artful angles of deflection would stand.

That would mean death, for the air supply in the dome would race out through a fissure almost before he could don his space suit.

However, his anxious eyes, scanning the vaulting roof, could find no crumpled bracing or ominous downward bulges. And he could hear no thin whine of air surging to escape from the fifteen pounds pressure in the hangar to the almost nonexistent pressure outside.

Then he glanced at the workbench and uttered an exclamation. The me-

teor he had left there was gone.

"It must have rolled off the bench," he told himself. "But if it's on the floor, why can't I see it?"

He froze into movelessness. Had that been a sound behind him? A sound, here, where no sound could possibly be made save by himself?

He whirled—and saw nothing. Nothing whatever, save the familiar expanse of smooth rock floor lighted with the cold white illumination broadcast on the power band.

He turned back to the workbench where the meteor had been, and began feeling over it with his hands, disbelieving the evidence of his eyes.

Another exclamation burst from his lips as his fingers touched something hard and smooth and round. The meteor. Broken into two halves, but still here. Only, *now it was invisible!*

"This," said Hartigan, beginning to sweat a little, "is the craziest thing I ever heard of!"

He picked up one of the two invisible halves and held it close before his eyes. He could not see it at all, though it was solid to the touch. Moreover, he seemed able to see through it, for nothing on the other side was blotted out.

Fear increased within him as his fingers told him that the two halves were empty, hollow. Heavy as the ball had been, it consisted of nothing but a shell about two inches thick. Unless—

"Unless something really did crawl out of it when it split apart."

But that, of course, was ridiculous.

"It's just an ordinary metallic chunk," he told himself, "that split open with a loud bang when it cooled, due to contraction. The only thing unusual about it is its invisibility. That is strange."

He groped on the workbench for the other half of the thick round shell. With a half in each hand, he started toward the stock room, meaning to lock up this

odd substance very carefully. He suspected he had something beyond price here. If he could go back to Earth with a substance that could produce invisibility, he could become one of the richest men in the universe.

He presented a curious picture as he walked over the brilliantly lighted floor. His shoulders sloped down with the weight of the two pieces of meteor. His bare arms rippled and knotted with muscular effort. Yet his hands seemed empty. So far as the eye could tell, he was carrying nothing whatever.

"What—"

He dropped the halves of the shell with a ringing clang, and began leaping toward the big doors. That time he *knew* he had heard a sound, a sound like scurrying steps! It had come from near the big doors.

When he got there, however, he could hear nothing. For a time the normal stillness, the ghastly, phenomenal stillness, was preserved. Then, from near the spot he had just vacated, he heard another noise. This time it was a gulping, voracious noise, accompanied by a sound that was like that of a rock crusher or a concrete mixer in action.

On the run, he returned, seeing nothing all this while; nothing but smooth rock floor and plain, metal-ribbed walls, and occasional racks of instruments.

He got to the spot where he had dropped the parts of the meteor. The parts were no longer there. This time it was more than a question of invisibility. They had disappeared actually as well as visually.

To make sure, Hartigan got down on hands and knees and searched every inch of a large circle. There was no trace of the thick shell.

"Either something brand-new to the known solar system is going on here," Hartigan declared, "or I'm getting as crazy as they insisted poor Stuyvesant was."

Increased perspiration glinted on his

forehead. The fear of madness in the lonelier emergency fields was a very real fear. United Spaceways had been petitioned more than once to send two men instead of one to manage each outlying field; but Spaceways was an efficient corporation with no desire to pay two men where one could handle the job.

Again Hartigan could hear nothing at all. And in swift though unadmitted fear that perhaps the whole business had transpired only in his own brain, he sought refuge in routine. He returned to his task of testing the big doors, which was important even though dreary in its daily repetition.

The radio power unit was on, as he had left it. He closed the circuit.

Smoothly the enormous inner doors swung open on their broad tracks, to reveal the equally enormous outer portals. Hartigan stepped into the big air lock, and closed the inner doors. He shivered a little. It was near freezing out here in spite of the heating units.

There was a small control room in the lock, to save an operator the trouble of always getting into a space suit when the doors were opened. Hartigan entered this and pushed home the switch that moved the outer portals.

Smoothly, perfectly, their tremendous bulk opened outward. They always worked smoothly, perfectly. No doubt they always would. Nevertheless, rules said test them regularly. And it was best to live up to the rules. With characteristic trustfulness, Spaceways had recording dials in the home station that showed by power markings whether or not their planetary employees were doing what they were supposed to do.

Hartigan reversed the switch. The doors began to close. They got to the halfway mark; to the three-quarters—

Hartigan felt rather than heard the sharp, grinding jar. He felt rather than heard the high, shrill scream, a rasping shriek, almost above the limit of audibility, that was something to make

a man's blood run cold.

Still, without faltering, the doors moved inward and their serrated edges met. Whatever one of them had ground across had not been large enough to shake it.

"Jupiter!" Hartigan breathed, once more inside the huge dome with both doors closed.

HE SAT DOWN to try to think the thing out.

"A smooth, round meteor falls. It looks like an egg, though it seems to be of metallic rock. As it cools, it gets lighter in color, till finally it disappears. With a loud bang, it bursts apart, and afterward I hear a sound like scurrying feet. I drop the pieces of the shell to go toward the sound, and then I hear another sound, as if something were macerating and gulping down the pieces of shell, eating them. I come back and can't find the pieces. I go on with my test of opening and closing the main doors. As the outer door closes, I hear a crunching noise as if a rock were being pulverized, and a high scream like that of an animal in pain. All this would indicate that the meteor *was* a shell, and that some living thing *did* come out of it.

"But that is impossible.

"No form of life could live through the crash with which that thing struck the Moon, even though the lava ash did cushion the fall to some extent. No form of life could stand the heat of the meteor's fall and impact. No form of life could eat the rocky, metallic shell. It's utterly impossible!

"Or—is it impossible?"

He gnawed at his knuckles and thought of Stuyvesant.

Stuyvesant had been assigned to the emergency dome on Mercury. There was a place for you! An inferno! By miracles of insulation and supercooling systems the hangar there had been made livable. But the finest of space suits

could not keep a man from frying to death outside. Nothing to do except stay cooped up inside the hangar, and pray for the six-month relief to come.

Stuyvesant had done that. And from Stuyvesant had begun to come queer reports. He thought he had seen something moving on Mercury near his landing field. Something like a rock!

Moving rocks! With the third report of that kind, the corporation had brought him home and turned him over to the board of science for examination. Poor Stuyvesant had barely escaped the lunatic asylum. He had been let out of Spaceways, of course. The corporation scrapped men suspected of being defective as quickly as they scrapped suspect material.

"When a man begins to see rocks moving, it's time to fire him," was the unofficial verdict.

The board of science had coldly said the same thing, though in more dignified language.

"No form of life as we know it could possibly exist in the high temperature and desert condition of Mercury. Therefore, in our judgment, Benjamin Stuyvesant suffered from hallucination when he reported some rocklike entity moving near Emergency Hangar RC10."

Hartigan glanced uneasily toward the workbench on which the odd meteor had rested.

"No form of life as we know it."

There was the catch. After all, this interplanetary travel was less than seventy years old. Might there not be many things still unknown to Earth wisdom?

"Not to hear the board of science tell it," muttered Hartigan, thinking of Stuyvesant's blasted career.

He thought of the Forbidden Asteroids. There were over two dozen on the charts on which, even in direst emergency, no ship was supposed to land. That was because ships had landed there, and had vanished with-

out trace. Again and again. With no man able to dream of their fate. Till they simply marked the little globes "Forbidden," and henceforth ignored them.

"No form of life as we know it!"

Suppose something savage, huge, invisible, lived on those grim asteroids? Something that developed from egg form? Something that spread its young through the universe by propelling eggs from one celestial body to another? Something that started growth by devouring its own metallic shell, and continued it on a mineral instead of vegetable diet? Something that could live in any atmosphere or temperature?

"I am going crazy," Hartigan breathed.

In something like panic he tried to forget the affair in a great stack of books and magazines brought by the last supply ship.

The slow hours of another month ticked by. The full Earth waned, died, grew again. Drearily Hartigan went through the monotony of his routine. Day after day, the term "day" being a strictly figurative one on this drear lunar lump.

He rose at six, New York time, and sponged off carefully in a bit of precious water. He ate breakfast. He read. He stretched his muscles in a stroll. He read. He inspected his equipment. He read. He exercised on a set of home-made flying rings. He read.

"No human being should be called on to live like this," he said once, voice too loud and brittle.

But human beings did have to live like this, if they aspired to one of the big posts on a main planet.

He had almost forgotten the strange meteor that had fallen into lava ash at his feet a month ago. It was to be recalled with terrible abruptness.

He went for a walk in a direction he did not usually take, and came upon a shallow pit half a mile from the dome.

Pits, of course, are myriad on the Moon. The whole surface is made up of craters within craters. But this pit was not typical in conformation. Most are smooth-walled and flat-bottomed. This pit was ragged, as if it had been dug out. Besides, Hartigan had thought he knew every hole for a mile around, and he did not remember ever seeing this one.

He stood on its edge looking down. There was loose rock in its uncraterlike bottom, and the loose rock had the appearance of being freshly dislodged. Even this was not unusual in a place where the vibration of a footstep could sometimes cause tons to crack and fall.

Nevertheless, Hartigan could feel the hair rise a bit on the back of his neck as some deep, instinctive fear crawled within him at sight of the small, shallow pit. And then he caught his lips between his teeth and stared with wide, unbelieving eyes.

On the bottom of the pit a rock was moving. It was moving, not as if it had volition of its own, but as if it were being handled by some unseen thing.

A fragment about as big as his body, it rolled over twice, then slid along in impatient jerks as though a big head or hoof nudged at it. Finally it raised up from the ground and hung poised about seven feet in the air!

Breathlessly, Hartigan watched, while all his former, almost superstitious fear flooded through him.

The rock fragment moved up and down in mid-space.

"Jupiter!" Clow Hartigan breathed hoarsely.

A large part of one end suddenly disappeared. A pointed projection from the main mass of rock, it broke off and vanished from sight.

Another large chunk followed, breaking off and disappearing as though by magic.

"Jupiter!"

There was no longer doubt in Harti-

gan's mind. A live thing had emerged from the egglike meteor twenty-seven days ago. A live thing, that now roamed loose over the face of the Moon.

But that section of rock, which was apparently being devoured, was held seven feet off the ground. What manner of creature could come from an egg no larger than his head and grow in one short month into a thing over seven feet tall? He thought of the Forbidden Asteroids, where no ships landed, though no man knew precisely what threat lurked there.

"It must be as big as a mastodon," Hartigan whispered. "What in the universe—"

The rock fragment was suddenly dropped, as if whatever invisible thing had held it had suddenly seen Hartigan at the rim of the pit. Then the rock was dashed to one side as if by a charging body. The next instant loose fragments of shale scattered right and left up one side of the pit as though a big body were climbing up and out.

The commotion in the shale was on the side of the pit nearest Hartigan. With a cry he ran toward the hangar.

With fantastic speed, sixty and seventy feet to a jump, he covered the ragged surface. But fast as he moved, he felt that the thing behind him moved faster. And that there *was* something behind him he did not doubt for an instant, though he could neither see nor hear it.

It was weird, this pygmy human form in its bulky space suit flying soundlessly over the lunar surface under the glowing ball of Earth, racing like mad for apparently no reason at all, running insanely when, so far as the eye could tell, nothing pursued.

But abysmal instinct told Hartigan that he was pursued, all right. And instinct told him that he could never reach the hangar in the lead. With desperate calmness he searched the ground still lying between him and the hangar.

A little ahead was a crack about a hundred feet wide and, as far as he knew, bottomless. With his oversized Earth muscles he could clear that in a gigantic leap. Could the ponderous, invisible thing behind him leap that far?

He was in mid-flight long enough to turn his head and look back, as he hurtled the chasm in a prodigious jump. He saw a flurry among the rocks at the edge he had just left as something jumped after him. Then he came down on the far side, lighting in full stride like a hurdler.

He risked slowing his speed by looking back again. A second time he saw a flurry of loose rock, this time on the near side of the deep crack. The thing had not quite cleared the edge, it seemed.

He raced on and came to the small air-lock door. He flung himself inside. He had hardly got the fastener in its groove when something banged against the outside of the door.

The thing pursuing him had hung on the chasm's edge long enough to let him reach safety, but had not fallen into the black depths as he had hoped it might.

"But that's all right," he said, drawing a great sigh of relief as he entered the hangar through the inner door. "I don't care what it does, now that I'm inside and it's out."

He got out of the space suit, planning as he moved.

THE THING outside was over seven feet tall and made of some unfleshlike substance that must be practically indestructible. At its present rate of growth it would be as big as a small space liner in six months, if it weren't destroyed. But it would have to be destroyed. Either that, or Emergency Station RC3 would have to be abandoned, and his job with it, which concerned him more than the station.

"I'll call Stacey to send a destroyer," he said crisply.

He moved toward the Bliss transmitter, eyes glinting. Things were happening on the Moon, now, all right! And the thing that was happening was going to prove Stuyvesant as sane as any man, much saner than the gray-bearded goats on the board of science.

He would be confined to the hangar till Stacey could send a destroyer. No more strolls. He shuddered a little as he thought of how many times he must have missed death by an inch in his walks during the past month.

Hartigan got halfway to the Bliss transmitter, skirting along the wall near the small air lock.

A dull, hollow, booming sound filled the great hangar, ascending to the vaulted roof and seeming to shower down again like black water.

Hartigan stopped and stared at the wall beside him. It was bulging inward a little. Startled out of all movement, he stared at the ominous, slight bulge. And as he stared, the booming noise was repeated, and the bulge grew a bit larger.

"In the name of Heaven!"

The thing outside had managed to track him along the wall from the air lock, perhaps guided by the slight vibration of his steps. Now it was blindly charging the huge bulk of the hangar like a living, ferocious ram.

A third time the dull, terrible booming sound reverberated in the lofty hangar. The bulge in the tough metal wall spread again; and the two nearest supporting beams gave ever so little at the points of strain.

Hartigan moved back toward the air lock. While he moved, there was silence. The moment he stopped, there was another dull, booming crash and a second bulge appeared in the wall. The thing had followed him precisely, and was trying to get at him.

The color drained from Hartigan's face. This changed the entire scheme of things.

It was useless to radio for help now. Long before a destroyer could get here, the savage, insensate monster outside would have opened a rent in the wall. That would mean Hartigan's death from escaping air in the hangar.

Crash!

Who would have dreamed that there lived anywhere in the universe, on no matter how far or wild a globe, a creature actually able to damage the massive walls of a Spaceways hangar? He could see himself trying to tell about this.

"An animal big enough to crack a hangar wall? And invisible? Well!"

Crash!

The very light globes, so far overhead, seemed to quiver a bit with the impact of this thing of unguessable nature against the vast semisphere of the hangar. The second bulge was deep enough so that the white enamel which coated it began chipping off in little flakes at the bulge's apex.

"What the devil am I going to do?"

The only thing he could think of for the moment was to move along the wall. That unleashed giant outside must not concentrate too long on any one spot.

He walked a dozen steps. As before, the ramming stopped while he was in motion, to start again as he halted. As before, it started at the point nearest to him.

Once more a bulge appeared in the wall, this time bigger than either of the first two. The metal sheets sheathing the hangar varied a little in strength. The invisible terror outside had struck a soft spot.

Hartigan moved hastily to another place.

"The whole base of the hangar will be scalloped like a pie crust at this rate," he gritted. "What can I—"

Crash!

He had inadvertently stopped near a rack filled with spare power bulbs. With its ensuing attack the blind fury had knocked the rack down onto the floor.

Hartigan's jaw set hard. Whatever he did must be done quickly. And it must be done by himself alone. He could not stay at the Bliss transmitter long enough to get New York and tell what was wrong, without giving the gigantic thing outside a fatal number of minutes in which to concentrate on one section of wall.

He moved slowly around the hangar, striving to keep the invisible fury too occupied in following him to get in more than an occasional charge. As he walked, his eyes went from one heap of supplies to another in search of a possible means of defense.

There were ordinary weapons in plenty, in racks along the wall. But none of these, he knew, could do material harm to the attacking fury.

He got to the great inner doors of the main air lock in his slow march around the hangar. And here he stopped, eyes glowing thoughtfully.

The huge doors had threatened in the early days to be the weak points in the Spaceways hangars. So the designers, like good engineers, had made the doors so massive that in the end they were stronger than the walls around them.

Bang!

A bulge near the massive hinges told Hartigan that the thing outside was as relentless as ever in its effort to break through the wall and get at him. But he paid no attention to the new bulge. He was occupied with the doors.

If the invisible giant could be trapped in the main air lock between the outer and inner portals—

"Then what?" Hartigan wondered.

He could not answer his own question. But, anyway, it seemed like a step in the right direction to have the attacking fury penned between the doors rather than to have it loose and able to charge the more vulnerable walls.

"If I can coop it in the air lock, I might be able to think of some way to attack it," he went on.

He pushed home the control switch which set the broadcast power to opening the outer doors. And *that* gave him an idea that sent a wild thrill surging through him.

A heavy rumble told him that the motors were swinging open the outer doors.

"Will the thing come in?" he asked himself tensely. "Or has it sense enough to scent a trap?"

Bang!

The inner doors trembled a little on their broad tracks. The invisible monster had entered the trap.

"Trap?" Hartigan smiled mirthlessly. "Not much of a trap! Left to itself, it could probably break out in half an hour. But it won't be left to itself."

He reversed the switch to close the outer portals. Then, with the doors closed and the monster penned between, he got to work on the idea that had been born when he pushed the control switch.

Power, oceans of it, flooded from the power unit at the touch of a finger. A docile servant when properly channeled, it could be the deadliest thing on the Moon.

He ran back down the hangar to the stock room, and got out a drum of spare power cable. As quickly as was humanly possible, he rolled the drum back to the doors, unwinding the cable as he went.

It was with grim solemnity that he made his next move. He had to open the inner doors a few inches to go on with his frail plan of defense. And he had to complete that plan before the thing in the air lock could claw them open still more and charge through. For all their weight the doors rolled in perfect balance; and if the unseen terror could make dents in the solid wall, it certainly was strong enough to move the partly opened doors.

Speed! That was the thing that would

make or break him. Speed, and hope that the power unit could stand a terrific overload without blowing a tube.

With a hand that inclined to tremble a bit, Hartigan moved the control switch operating the inner doors, and instantly cut the circuit again.

The big doors opened six inches or so, and stopped.

Hartigan cut off the power unit entirely, and dragged the end of the spare power cable to it. With flying fingers he disconnected the cable leading from the control switch to the motors that moved the portals, and connected the spare cable in its space.

He glanced anxiously at the doors, and saw that the opening between them had widened to more than a foot. The left door moved a little even as he watched.

"I'll never make it!"

But he went ahead.

Grabbing up the loose end of the cable, he threw it in a tangled coil as far as he could through the opening and into the air lock. Then he leaped for the power unit—and watched.

The cable lay unmoving on the air-lock floor. But the left door moved! It jerked, and rolled open another six inches.

Hartigan clenched his hands as he stared at the inert cable. He had counted on the blind ferocity of the invisible terror; had counted on its attacking, or at least touching, the cable immediately. Had it enough intelligence to realize dimly that it would be best to avoid the cable? Was it going to keep on working at those doors till—

The power cable straightened with a jerk. Straightened, and hung still, with the loose end suspended in midair about six feet off the air-lock floor.

Hartigan's hand slammed down. The broadcast power was turned on to the last notch.

With his heart hammering in his throat, Hartigan gazed through the two-

foot opening between the doors. Gazed at the cable through which was coursing oceans, Niagaras of power. And out there in the air lock a thing began to build up from thin air into a spectacle that made him cry out in wild horror.

He got a glimpse of a massive block of a head, eyeless and featureless, that joined with no neck whatever to a barrel of a body. He got a glimpse of five legs, like stone pillars, and of a sixth that was only a stump. ("That's what got caught in the doors a month ago—its leg," he heard himself babbling with insane calmness.) Over ten feet high and twenty feet long, the thing was, a living battering-ram, painted in the air in sputtering, shimmering blue sparks that streamed from its massive bulk in all directions.

Just a glimpse, he got, and then the monster began to scream as it had that first day when the door maimed it. Only now it was with a volume that tore at Hartigan's eardrums till he screamed himself in agony.

As he watched, he saw the huge carcass melt a little, like wax in flame, with the power cable also melting slowly and fusing into the cavernous, rocky jaws that had seized it. Then with a rush the whole bulk disintegrated into a heap of loose mineral matter.

Hartigan turned off the power unit and collapsed, with his face in his hands.

THE SHINING ball of the full Earth floated like a smooth diamond between two vast, angular mountains. The full Earth.

Hartigan turned from the porthole beside the small air lock and strode to the Bliss radio transmitter.

"RC3, RC3, RC3," he droned out.

There was no answer. As usual, Stacey was taking his time about answering the Moon's signal.

"RC3, RC3—"

There he was.

"Hartigan talking. Monthly report."

"All right, Hartigan."

A hurried, fretful voice. Come on, Moon; report that, as always, nothing has happened.

"Lunar conditions the same," said Hartigan. "No ships have put in, or have reported themselves as being in distress. The hangar is in good shape, with no leaks."

"Right," said Stacey, in the voice of a busy man. "Supplies?"

"You might send up a blonde."

"Be serious, please. Supplies?"

"I need some new power bulbs."

"I'll send them on the next ship. Nothing irregular to report?"

Hartigan hesitated.

On the floor of the main air lock was a mound of burned, bluish mineral substance giving no indication whatever that it had once possessed outlandish, incredible life. In the walls of the hangar at the base were half a dozen new dents; but ricocheting meteors might have made those. The meteoric shell from which this bizarre animal had come had been devoured, so even that was not left for investigation.

He remembered the report of the board of science on Stuyvesant.

"Therefore, in our judgment, Benjamin Stuyvesant suffered from hallucination—"

He would have liked to help Stuyvesant. But on the other hand Stuyvesant had a job with a secondhand-space-suit store now, and was getting along pretty well in spite of Spaceways' dismissal.

"Nothing irregular to report?" repeated Stacey.

Hartigan stared, with one eyebrow sardonically raised, at the plump brunette on the pink *Radio Gazette* cover pasted to the wall. She stared coyly back over a bare shoulder.

"Nothing irregular to report," Hartigan said steadily.

"THE SHADOW OF THE VEIL"



BY RAYMOND Z. GALLUN

"THE SHADOW OF THE VEIL"

A man made himself a brutal god— But a god should know the strange properties of his subjects!

GRUD lifted himself out of the waves. His ponderous bulk stood there in the surf, its massive, horn-plated head hunched down sullenly, its sloping, walruslike shoulders dripping brine. In the acrid volcanic murk that floated out to sea from beyond the crags of the coast, Grud looked like some legendary demon come to life.

But there was no one to observe except the great nautilus-squids that rolled on the beach with every surging beat of the ocean. Unless, of course, Ree-Jaar-Env somehow saw too—

Grud's Gargantuan frame stiffened in reminiscence, and he paused momentarily, as if to seek concealment. But no, that was not the way, now that he was trying to work up the courage needed to act on a wild plan. He must appear submissive. He must be careful as never before, even though to do so imposed a painful burden of self-control.

Grud let his huge, flipperlike paws, adapted both for swimming and for the handling of objects, dangle limply at his sides, in direct contradiction to the hatred and fury that blazed within him.

Ree-Jaar-Env was the black god who had recently come to Karud, Grud's world, oppressing, demanding tribute, showing at every turn that his magic was greater than any possible defiance. Death was his lash—death spat from the mouth of his image. Death spat, invisibly too, from the depths of the sky. There seemed no way to fight such a taskmaster.

Still, Grud was full of memories of the old peace. Not long ago his clan had dwelt comfortably there, in the sea-washed caves of the coastal cliffs. They had hunted food in the blue depths.

They had played their simple games together. They had reared their offspring. They had conceived and worshiped their own gods—the big blue sun that blazed through the mists, and Leedaav, the ghostly veil that shifted and waxed and dwindled there in the heavens, working an awful, periodic wonder.

Grud did not know the nature of Leedaav, the Veil. Astronomy was beyond his grasp. He was not aware that that whirling, silvery miracle was a cloud of cosmic dust that followed an immense planetary path around the giant blue sun, and just within the orbit of Karud itself. Perhaps that nebulous mass, many millions of miles in extent, was the wreckage of two planets that had collided. But to Grud's primitive mind, such things were inconceivable. He was unaware, even that Karud was a globe, or that it had an orbit.

For the present he had forgotten that old divinity of fear, Leedaav, the Veil. It was time to go to the worshiping place to confer with Ree-Jaar-Env, who was far more terrible. If Grud delayed even for a moment, there was danger.

Moving erect on his hind feet, but shuffling awkwardly, for the land was not the natural habitat of his kind, he advanced along the beach toward the mouth of a gully which led upward among the crags.

WHEN HE reached the gully entrance, he heard a long, soaring hoot from up its dank, fern-packed throat. The sound was the cry of Ree-Jaar-Env. It was the same cry which had first drawn Grud's clan to an investigation that had found for them their devilish master. Several evenings before that

hoot had first echoed over the hills and jungles and sea, there'd been a flash and a roar from the heavens, like the falling of a great meteor. Hours after that there'd been another flash and roar, ascending toward the stars. Minutes later, the cry had begun.

Familiar though that weird ululation was to him now, hearing it again still could cause Grud's cold pulses to quicken. Mixed with the sound was the savage, bubbling grunt of a colossal denizen of the inland marshes. Grud could picture what was happening up there behind the crags easily enough, yet fascination drove him to haste.

At an awkward run he advanced up the gully, where the broad feet of his kind, going to their worship, had worn a path through the thickets of tall, pale ferns. Long-winged dragon flies buzzed in the hot, golden air, but Grud, of course, paid them not the slightest attention.

He stopped at last behind the bole of a giant fern, and peered into the little glade ahead. Scarcely any vegetation grew there. The ground was just oozy mud, mixed with the rotting, oily stuff of dead animal flesh—the flesh of Grud's own kind, for the most part.

At the center of the glade, in ghoulish glory, amid the bones and the reeking stench of his dreadful sanctuary, stood the idol of Ree-Jaar-Env.

Grud had never seen a human being in his life, but that was what this black image, wrought crudely in painted metal, represented. It was not a portrait. The hands that had molded its clay pattern, had been too unskilled for that. Nevertheless there was a certain ruthless brutality stamped into the heavy features and frowning brows.

At the other side of the glade hunched the swamp monster, ready for the charge. The animal looked a bit like a carnivorous dinosaur of Earth's mesozoic epoch. Its jaws slavered as it opened and closed a mouth bristling with

teeth, some of them six inches in length. Once again Ree-Jaar-Env, that towering black presence there, surrounded by the decaying evidence of its destructive might, had aroused a horny swamp-lord to battle pitch. The animal arched its short, armored neck snakishly. Then at last it leaped.

Grud felt a sort of thrill at sight of that reckless, insensate audacity. But he knew the outcome before it became fact. The siren concealed within the idol still hooted. From the lips of Ree-Jaar-Env there flashed a thin jet of white fire. The swamp-lord burst apart like a smashed balloon. Tatters of flesh and bone and entrails flew in every direction, as the minute atomic bullet exploded. Like a solid thing, the sound of the concussion beat its way through the fern-jungles to the tops of the distant, murky mountains, and surged back and forth again and again in echoes that mocked the futility of simple brute poweress, when pitted against magic.

GRUD GAVE a brief start. His huge muscles trembled. Fear was in him, but he longed to hurl himself along the same path of fury that the shattered giant had followed. At least such action would express defiance; at least it would be an attempt, however futile.

But Grud could not let this impulse rule him. Not when there was perhaps another, better chance. He forced his fangs and great molars to relax their gritted pressure. He tried not to remember the odor of carrion, most of which had once formed the bodies of his comrades. Cautiously, almost cringingly, he advanced into the glade, aware that in the next moment it was possible that he might be stricken down. But probably the god would at least converse with him first.

Humbly, before the idol, he raised his paws in submission. Still, in spite of his attitude, pride showed in him. That way, he looked like some outlandish

Vercingetorix, facing the throne of a conquering Caesar.

The eyes up there in that coarse, broad face of painted metal surveyed Grud with a cruel glitter in their quartz lenses. Grud had never heard of radio-vision or remote control, but he knew that through those eyes Ree-Jaar-Env saw him.

The divinity spoke, its microphonic voice ponderous and snarling, yet shrill when compared to the bull-roar of Grud's people.

"Three days have passed since the latest offering, Stupid One. That is too long a time."

The words, belonging to the primitive tongue of the Surf People, were crudely assembled, and faulty in pronunciation, but Grud could make no mistake as to their meaning. Once Ree-Jaar-Env had been unable to speak the language of the Surf People at all. Still, with great noises and bursting death, much of which came, not from the lips of this image, but from the inscrutable heavens, where his real self was evidently located, he had terrified his devotees into abject slavery. And with a strange force-magic he had jerked the necklaces of pearls from their throats, carrying them up into the sky. So they had known what this vengeful deity required in the way of tribute.

Pearls! Great, rosy pearls, the like of which had never been found on Earth. Grud could picture in his mind his clansmen down there on the dark sea floor, groping among the shells of the giant mollusks that produced these jewels, searching the ooze for more treasure, struggling against water pressures that they were scarcely able to endure. Somehow they had to find enough wealth to again appease Ree-Jaar-Env's lust. Unless—

Grud smothered the thought, for he could not be sure that the soul of the black idol could not sense his very purposes.

"Tonight, Ree-Jaar-Env," he grumbled, scarce daring to plan. "Tonight we shall bring you another offering—"

HIS PROMISE ended in a hoarse grunt of pain. One of the small, movable tubes, the muzzles of which were just visible between the lips of the god, was aimed at him. From it a dart had shot out and had embedded itself deep in the scaly flesh of Grud's chest. Grud shivered as he plucked the tiny torture splinter of metal away. But the fiery sting of the formic acid which the dart had borne, could not be so easily removed. Grud turned; he almost leaped frothing at his invulnerable tormentor. But he checked himself just in time—

"It is well, Witless One," said Ree-Jaar-Env, "that you remembered who it is that rules. It would have pleased me had you lost your sense completely. Now go. But here is another thing for you to hold in your mind: If the gift is not enough, I shall not be satisfied to kill a few of your tribe, and to spit darts of punishment into the bodies of some of the others. I tell you surely that the very ocean beside which you live shall boil, and that the cliffs shall fall down upon you!"

Grud of the Surf People turned away. He tried not to scowl, but even if that hideous, fanged visage of his had registered its most malevolent expression, it could not have betrayed adequately the hate that was his. Torture darts Grud had felt before, but in the stinging pain that now burned in his chest muscles, there seemed to be concentrated the anguish and grief of all the wrongs that had been done to himself and to his clan since the beginning of the black god's dominion. The urge of murder swept the last drops of fear from his mind like a hungry tide. Superstitious dread and the recognition of things probably insurmountable, could mean nothing to him in his present mood.

As he ambled back down the gully,

he was visualizing, with the same vividness of imagination that children often display, just what would happen again tonight. His tribesmen would come here to Ree-Jaar-Env's sanctuary. They would bring the skin of a sea monster, formed into a sort of sack, and partly filled with pearls. They would deposit the skin before the idol. Then tiny lights of an unknown energy would flicker around the former, and it would lift upward, gaining speed magically, as if pulled by an unseen hand. The skin would vanish toward the stars—toward the hidden lair, where the real Ree-Jaar-Env concealed himself.

But why shouldn't there be two skins instead of one? Grud took hold of that wild scheme of his with grim determination. No more did he waver, as the hunger for vengeance shrieked in every cell of his vast, coarse carcass. Poor primitive that he was, he did not know that ten thousand miles of frigid vacuum lay between himself and the object of his hate.

Tarl and Rebu would give him help. He might have to argue and challenge and ridicule, to raise their courage above their fears. But they would carry the second skin—

RICHARD ENVERS looked at the radiovision screen before him, and smiled a slow smile. He was handsome, maybe fifty, and his physique was broad and powerful. His face wore no signs of real cruelty. The game he was engaged in was only a business proposition to him. He'd ranged the interstellar regions for a long time, looking for a way to rebuild a broken fortune. Back home on Earth he had two daughters and a son who were clamoring for this and that, on a pretty expensive scale. And—well, a fellow didn't like to let the kids down, of course, particularly when it wasn't possible to see them more than once every few years, on the occasions of his rare visits at home.

"The sweetest racket that's ever been thought up, eh, boss?" said the little spindle of a man who stood beside Envers in the pilot compartment of the spaceship. "No danger to ourselves up here. No work to speak of. No exposure to heat and bugs and possible disease germs. Nothing to do but ride our gravity screens, round and round the planet, over the place where these water babies live, and make a big noise down below. Gosh, lucky we got those dizzy natives for stooges! It's a cinch we wouldn't get far if we had to gather those pearls alone. Good thing we saw our friends wearing those necklaces, when we landed. Binoculars come in mighty handy—"

To this enthusiastic speech, however, Richard Envers offered no response except an absent nod. His attention was occupied by the view in the screen—a view radioed up from the television apparatus concealed in the body of the thing known to the Surf People as Ree-Jaar-Env.

Illuminated by a weird light—not moonlight, exactly, but something very similar—a horde of those grotesque primitives was visible in that plate of ground glass. It had been quite unnecessary for Envers to move the remote-control switch that would turn on the floodlamps behind the eyes of the image of the god, far, far below, beneath the enwrapping gases of a dense atmosphere.

Envers noted with satisfaction that the Surf People still bowed humbly before the idol. He noted also, that they had brought two bulging, oily skins, which at first glance was most satisfying.

The man, however, was not fooled for more than a moment. One skin was decidedly well-filled, and it bulged in a manner that was all wrong for its supposed contents. Its shape was quite like that of a Surf Man, huddled up to occupy as little room as possible.

Richard Envers grinned at this trans-

parent evidence of naive craft. "You see, Muggsie," he said to his companion, "one of the more ambitious boys from down under, wants to pay us a visit. I guess maybe he'd like it quite a bit if he could take us apart and see what makes us tick, eh?"

Muggsie gasped. "Gosh, boss!" he said. "That's crust, ain't it? But after all, he don't know what he's up against. Ten thousand miles of empty space, and just a hide to cover him. Whew! And he's used to a hot climate, too! Glory! He'd be frozen stiff before the attractor-beam pulled him more than a couple of hundred miles above the ground! What are you gonna do about it, boss? Give all those babies another good taste of hell?"

Envers seemed to consider briefly, glancing at the breech of the neutronic cannon nearby. "No," he said at last. "Not yet anyway. We'll just play dumb, as though we didn't smell anything fishy. Maybe we can figure out something real impressive to do with the corpse of our visitor. Meanwhile, though we can't neglect the usual dose of devil-medicine. Savage psychology, you understand. Helps keep the beasts in line. Fear is the only thing that will ever soak through their thick skulls."

Whereat, Richard Envers peered into a sighting device which was part of the radiovision apparatus before him. He jabbed buttons on the instrument panel, with no more show of emotion than if he were digging a hill of potatoes. From the speaker he heard the crash of a small atomic explosion. The idol had spat death again. Three Surf Men were killed. Their comrades were howling "Ree-Jaar-Env!" in hoarse, submissive terror.

But Envers reacted only in terms of commercial satisfaction. From time immemorial, on Earth, there had been men like him, neither cruel nor kindly. They had helped to build and to wreck empires.

Touching the switch of a microphone, Envers spoke a guttural command in the language of his wild subjects. Radio waves sent it winging down there to the receiver in the image.

The Surf People began to disperse. Envers pressed a lever. The attractor-beam was now in action. The two skins pictured in the view-screen leaped upward, and disappeared from sight.

Envers stretched luxuriously. "It'll be quite a while before the pearls and our bold native arrive here, Muggsie," he said. "I'm going to take a nap for an hour or so. You watch things—"

TO GRUD, the sensations of flight upward through the atmosphere were thrilling and terrifying, yet at first not entirely unpleasant. Then he began to feel cold. Presently his lungs started to ache, as the air thinned. At last he was in the grip of the unknown.

What did Grud do? What was there for him to do? He huddled up tighter in that ballooning hide which was his only protection. And he prayed silently to the old gods of his clan—the blue star that was the center of this solar system, and most of all to Leedaav, the Veil. Grud, peeping through tears in the skin of the sea monster, saw that mass of dust shining, silvery and distant, just above the murky curve of the world he was leaving. That colossal ghost, reflecting light from its sunward flank, was far off now, yet Grud could remember its strange might—

He stared at it, and at the hardening stars, his deep-set, lizardlike eyes growing bloodshot because of decreasing atmospheric pressure. Frost glazed his lips. He struggled, but the attractor-beam pulled him on toward the sky that was changing from nocturnal purple to brittle, gray-streaked black. His body was growing numb in the tenuous, frigid wind of his swift passage through the upper stratosphere. In the shadow of the planet, there was no sunshine to re-

place heat-loss. Grud's chest expanded and contracted, searching breath, but it worked like the spring of a broken toy—without resistance. Grud's last movement, almost, was a tightening and then a relaxing grip on the handle of the great stone club that was to have been his tool of revenge.

RICHARD ENVERS, clad in a vacuum armor, was the one who jockeyed the two skins and their contents into the airlock of the spaceship. With a sharp knife he cut the now brittle and frozen rawhide of each sacklike wrapper. There were the pearls, beautiful rainbow-sheened spheres, many of them perfect. And there was the dead visage of him who had dared.

Frozen blood in great, dark nostrils. And a frozen look of pain on hideous, curling lips that revealed long fangs, coated with frozen saliva. Grud's corpse was bloated a little, and it was as rigid as a statue carved from oak. The loss of warmth may be gradual in a vacuum, but there had been time enough to congeal every trace of fluid in Grud's body. The only impassable limit of cold in the void is absolute zero, and the decline toward that point is steady. Grud's eyelids were tightly closed in a final effort at protection.

Richard Envers felt a bit sickened, somehow, at the thought of how terrifying this strange death must have been to the monstrous Surf Man, torn from a tropic world to a—to him—inconceivable, frigid destruction. It was almost the first time that Envers had ever felt any pang of regret.

Yet he shrugged it aside easily, and turned on the heat in the airlock compartment. Pearls might crack if the temperature was raised too abruptly. But the thermostats would take care of that. As for the body, it might be an interesting thing to examine when it thawed. Then, mutilated and once more frozen, it could be hurled back to the

stamping ground of the Surf People—a grim example.

NEMESIS crept upon Richard Envers while he was asleep. He had spent most of the short daylight hours playing chess with Muggsie Manners. Before turning in after nightfall, he had taken a brief look into the airlock compartment, noting that all was apparently well.

Deep in luxurious slumber, he hadn't heard the shattering of the lightly constructed inner portal of the lock, or the tumult in the pilot room that accompanied the murder of his assistant.

And now, in his narrow quarters, there was towering over him a vast, black bulk. The sound of the door being clubbed into a dented piece of wreckage had, of course, aroused him to quick wakefulness. But there was no weapon within reach. Why should there be any need for a weapon, here in the deserted safety of an untracked part of space?

Still hazy-minded with sleep, Envers looked in unbelief at the gigantic Surf Man looming there, beside the little collapsible metal stand which held his toilet articles.

There was no light in the room, except that which came through the small window. It was the shine of the Veil, which, in its slightly sunward orbit, peeped around the bulk of Karud, planet of Ree-Jaar-Env's worshipers.

Richard Envers, real self of the god, began to think very swiftly. There was nothing that he could do to save himself. Retreat through the doorway was effectively blocked. And it would take a wrench and minutes of work, to unscrew the fastenings of that massive window, built to resist even the impacts of small meteors—even if there was time to get the vacuum armor out of its locker against the wall, and don it.

But before a huge flipper-hand descended upon Envers with crushing force, he almost had the answer to the

question of how this giant, so recently congealed and still, could be grimly animated again, now. Envers' association with this solar system had been too brief for him to have grasped even all of its simpler phenomena.

Now, however, he understood something previously unguessed. The Veil, and the planet of the Surf Men—they traveled around that Titanic blue star in tremendous orbits that were still only five million miles apart. And the Veil was huge in extent—

Richard Envers died with a bubbling gasp that followed a dull, ghoulish thud.

HIS KILLER staggered from the room. He was dizzy from his recent exposure in space. His muscles ached from the effects of expansion in the voidal vacuum, and from the freezing and thawing of his flesh. But he did not think his revival wonderful. To him it was the natural thing. The great, coarse cells of his cold-blooded flesh were made to endure such treatment. Life is a stubborn wonder, that struggles, always, to adapt itself to environment, however unfavorable the latter may be. The condition of sudden airlessness had been new to Grud, in a way—but not too new. For when winter came to his tropic world, it was a winter of terrible dark—and cold that froze even much of the atmosphere. There was only volcanic heat to combat that cold, and it was far from sufficient.

"Loodah!" Grud roared in the corridor. "Loodah!" Freedom! And the sound echoed in ringing, eerie triumph through the chambers of that suspended, man-made vessel.

So, in frightened anger, he shuffled back to the pilot compartment. His massive cudgel rose and fell. Glass splintered. Metal crumpled and tore. Robot mechanisms tried to take control of the ship's wavering tumble. But they were smashed in their boxes before they could send the proper guiding im-

pulses to rocket motors and gravity screens.

The craft nosed down toward a sea of cloud, white under the soft, slanting rays of Leedaav, the Veil. Grud shuddered, gripped by the sickening sensation of free fall. His flat, webbed fingers reached out to clutch a stanchion for useless support. He sensed his own end, yet in the shrieking clamor of disordered machines he read, too, the end of a black dominion.

The Veil. Again, as in the past, its shadow would come, blocking sunshine and warmth, turning a verdant world into a white, silent tomb. But Grud's people would sleep, then, in their caves, and they would awaken with the other life, when the shadow had gone by.

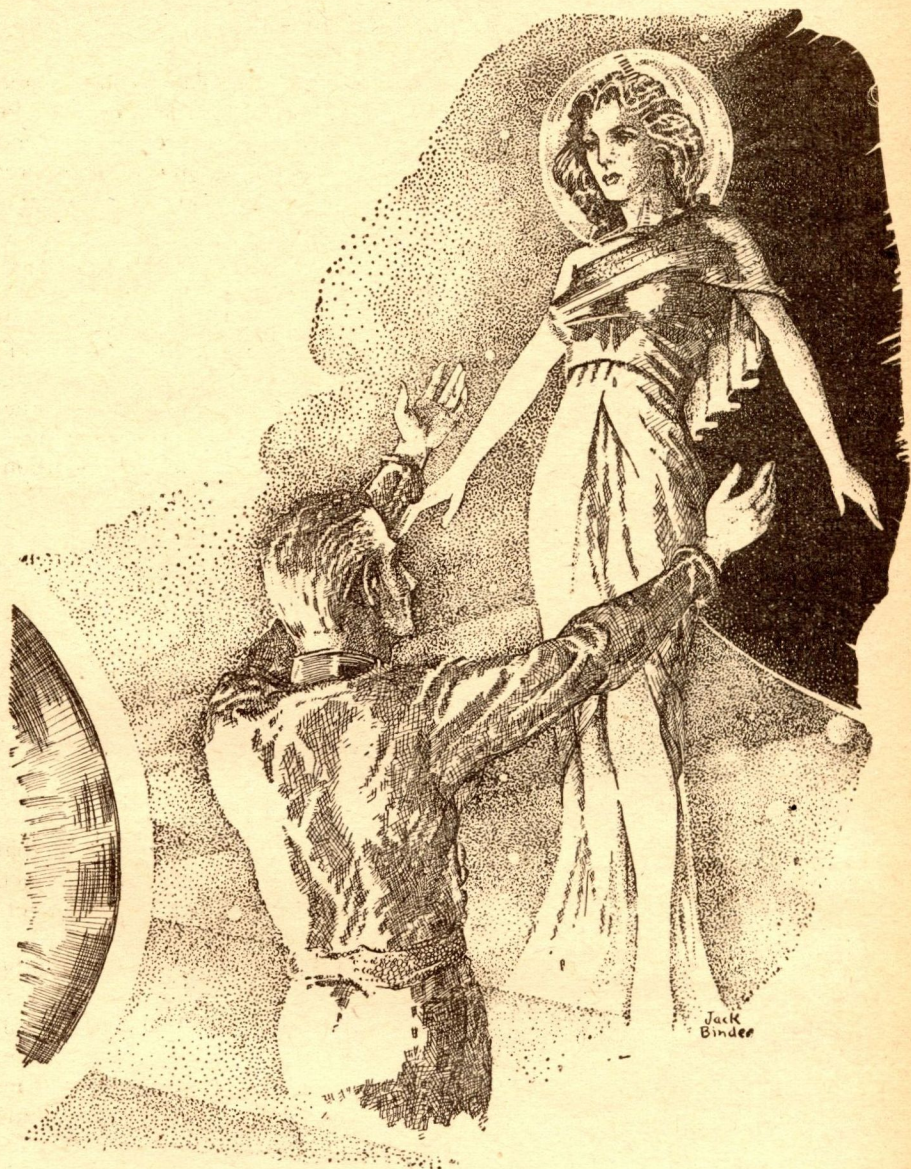
Grud knew nothing of the conditioning influences of evolution. He had never discussed suspended animation with a biologist. He thought of it only as a different kind of sleep.

Yet the lives of Surf People are long, and Grud was not too young to remember the most recent winter. The many days of gradually advancing twilight, the slow, inexorably strengthening chill. And the sensations of numbness and strangling pain that one tried to fight off, just before the slumber. Somewhat the same as the experience of that flight up into the sky—though much more gradual, and perhaps more dangerous.

"Leedaav!" Grud growled reverently. "Leedaav!"

The orbits of the Veil, and of Karud, the planet, were in the same plane. Their annual periods were not far from identical, and they moved in the same direction. Usually the two were far removed from each other, but at intervals they traveled side by side, like horses running neck to neck on a racetrack. Then the world of the Surf Men was in the dense shadow of an eclipse that did not pass away for more than one protracted year—

LORELEI OF SPACE



BY
FREDERIC ARNOLD KUMMER, JR.

LORELEI OF SPACE

It was a very peaceful world, a very efficient world, that the Lorelei showed Gorn—a world that Peace had moldered to dust-dead routine!

THE dancing girl was like a lambent flame. Her white feet wove quick-melting designs upon the dark, gleaming floor; her slim body, nude except for a few scarlet spangles, swayed temptingly to the chimes of bell-like *shelins*, the atavistic call of reedy Martian flutes. The men grouped in an ever-narrowing circle about her followed each movement with hungry eyes, eager for the passing touch of her hand, the faint, heady odor of her perfume. Mad at the very sight of a woman, these men, for the mark of the outer darkness was upon them. The strangeness of dim, fantastic worlds had left a gleam of bewilderment in their eyes; the drab, dreary monotony of months spent in space had drawn bitter lines about their mouths. Sometimes, when one would unexpectedly tap them on the shoulder, they would whirl about, reaching for heat guns that were not there. To a stranger this might have seemed the result of overwrought nerves—to a spaceman it was the normal caution of those accustomed to find danger in the most trivial variation from the normal.

Behind the bar, old Xoal nodded benignly, drumming his stumpy fingers in accompaniment to the music. The air in the little room was heavy with smoke of a hundred narcotics, the smell of a thousand liquors gathered from the corners of the universe. It was Xoal's boast that there was no strange drink he could not supply. On his shelves were row upon row of bottles, pain-killing *tenlis* from Saturn, white *yanu* of Venus, a glass of which made a minute seem like a year, and even the forbidden Mercu-

rian *olo*, as dark and cloudy as the dreams it provoked. And for each strange liquor there was a man to drink it. Here a lean, space-bitten engineer, his fingers gnarled from radium burns; here a flat-faced Lunar miner, his neck still bearing the red chafe of a close-fitting blaster's helmet; here a squat Jovian trapper, walking with the dragging step of one accustomed to the tremendous gravity of that vast planet.

Suddenly the music broke off, and the girl, scooping up the shower of coins tossed at her feet, ran toward the dressing room. Old Xoal, beaming, continued to hum the air under his breath.

"Oh, a girl on every planet, so what matter where I go!

There's a dusky maid on Venus, and a pale blonde on Io!

Aye, a brown-haired girl on Terra, and a redhead back at Mars!

There're girls for all the asteroids, and girls for all the stars,

So blasters let the rockets roar, and head for outer space!

The wanderlust's upon me, and—"

Xoal stopped his humming as an empty glass appeared on the bar before him.

"*Tong*," a deep voice rumbled. "Good Martian *tong*. The last drink of rotgut for me this side of Neptune!"

Xoal glanced up. A huge man with a broken nose and scarred face stood before him, brushing the red dust from his cloak.

"Captain Gorn!" the bartender smiled. "*Tong*, you say? Here you are. Compliments of the house. A nasty night out, eh?"

Gorn glanced through the window at the nearby space-port. A raging dust storm, the dreaded Martian *shela*, howled about the building, lashing it with fine red sand from the deserts. Even the massive crystalloid hangars were feeling the erosive blast, and mounds of dust were piling like snowdrifts in corners, about houses. Suddenly the flying field was lit up by a ruddy flash, flickering in the manner of Terrestrial lightning. Two spaceships, riding their columns of fire, settled slowly to the ground.

"INCOMING vessels," old Xoal observed, filling his pipe. "Mercis will not be attractive on such a night. You say that you are leaving?"

"In half an hour." Gorn glanced at his watch. "A cargo of *thorene* for the spore growers of Neptune. Months in space, but profitable. Even adventurers, Xoal, must do a bit of honest work now and then. I need the money to outfit the *Cosmic* for an expedition to Ceres which—" He broke off abruptly, holding his breath as a choking gust of red sand swirled through the open door.

With the sand there came a gaunt, gray man, whose uniform proclaimed him to be a member of the Interplanetary Patrol. The stranger's face was pale, his eyes dark, bottomless pits.

"A drink!" he croaked. "Quickly! *Tong!*"

Hurling down the fiery liquor, he shuddered, glanced upward. "There's a hell loose out there in space!"

"You from one of these ships that just landed?" old Xoal asked.

"Number 643, I. P.," the man nodded. "We . . . we found the *Maria Stella*."

As he spoke, a sudden hush fell over the crowd in the tavern; all eyes turned to him, questioningly.

"The *Maria Stella*!" Gorn said slowly. "Lost six months ago on the Neptune run! What happened to her?"

"Happened?" The man's voice broke. "I don't know! God! I . . . I don't know!"

Xoal refilled the stranger's glass. The drinks seemed to give new strength.

"We were cruising near the asteroids," he muttered. "Just a routine patrol. I was on watch at the time. Suddenly I noticed a freighter ahead of us—drifting. No rocket blasts, no lights. We came up alongside her. I volunteered to go aboard and investigate. Put on my space suit, stepped into the air lock, and jumped. I groped my way over the hull, using a magnetic grapple, reached the other side of her. The name *Maria Stella* was painted on her bow. I made my way aft until I reached her air lock. It was open, wide."

"Open?" Gorn frowned. "But—"

"Yes, open. I stepped in, with my heat-gun out." The stranger paused, staring at the floor. "She was empty! Deserted! Beds unmade—food still on the table, half-eaten—unfinished entry in the log— You see? Something interrupted all those things! Something . . . something unknown!"

"Pirates, perhaps," old Xoal whispered. "Maybe they killed the crew—"

"Pirates?" The I. P. man laughed harshly. "And leave ten thousand thael's worth of *ixite* in her holds? Besides, there was no sign of a struggle, nothing to show that the door of the air lock had been forced."

"Sudden fear may have caused them to abandon ship," Gorn suggested. "The lifeboat—"

"No." Stark horror filled the man's voice. "The lifeboat was in its compartment, the space suits in their lockers. And the door had been opened the only way it could be opened. *From the inside!* Don't you see? Without space suits, knowing sure death awaited them, they stepped out of the *Maria Stella* into the void!"

"Suicide," Gorn said reflectively. "But why?"

"Why?" Old Xoal glanced uneasily at the writhing shadows. "Some new terror of the outer darkness. Something that drifts in space—"

Gorn laughed.

"You've had too much *olo*, Xoal," he said. "This time tomorrow I'll be a million *langs* out in space on the way to Neptune. And if I meet your lurking horror, I'll tickle his ribs with a heat blast!" Gorn snapped on a pair of heavy dust goggles, drew his cloak up to cover his throat. "So long! See you in two months—"

II.

LIKE A SLEEK silver bullet the *Cosmic* sped through the dreary sameness of space, her rocket charges lashing out behind her in great ruddy jets of flame. Gorn, stretched on his bunk in the captain's cabin, stared at the rivet-studded bulkhead above him with bored eyes. Already the drab monotony of the trip was beginning to tell upon him. His restless mind, his Herculean muscles, ached for activity. Always in the past, on his exploratory voyages, there had been new and unknown adventures ahead to occupy his thoughts. But this, a purely commercial run, offered nothing. Unless the case of the *Maria Stella*— Gorn shook his head. Pirates, no doubt, had murdered her crew, been prevented from rifling the freighter by the approach of another vessel. No, there was nothing ahead except weeks of boredom. He sighed, rolled over, and a moment later dropped into a light sleep.

His slumbers were troubled by strange dreams. Faces, drawn, distorted faces, the men of his crew. And there was something . . . something that kept telling him to awake. Something that called in a honey-sweet voice, alluring, irresistible. With a start Gorn sprang from the bunk.

The first thing to register upon his

consciousness was the realization that the *Cosmic's* forward rockets had been turned on, were braking her forward motion. Soon she would be drifting— just as the *Maria Stella* had been drifting when they found her. Cold sweat broke out on Gorn's brow; he threw open the door of the cabin. The ship seemed strangely deserted.

"What's the trouble there? Jensen! Broul! What—"

His voice trailed off into nothingness. That queer siren call which had come to him in dreams gripped his brain, overpowering all thought, all strength of will. Stiffly, as though walking in his sleep, he moved along the corridor. *It* was calling him. He had to go— Strange desires, wild yearnings, pulled him forward like some compelling magnetic force. He had to free himself of the confining walls of this ship. Had to. *It* was calling.

As he approached the air lock Gorn saw another figure entering it. Jensen, the first mate, his face set in a rapt expression as one listening to far-away music. The sight of him momentarily broke the spell that held Gorn in its grip.

"Jensen!" he cried. "Don't . . . don't go!"

The mate did not turn his head. Gorn leaped forward, seized his arm, tried to drag him back. Jensen, although normally a man of no great physical strength, shook himself free without seeming effort. Gorn, his scarred viking's face unnaturally pale, peered through the thick glass pane of an observation window.

In the light that streamed from the *Cosmic's* portholes, he beheld a sight that took his breath away. A girl! A girl with long red-gold hair, creamy cheeks, and scarlet lips curved in a tempting smile. A thin, loose, white tunic emphasized every perfect curve of her slim, seductive body. She stood still, weightless in space, arms outstretched, eyes

glowing with soft promise. Gorn trembled. No illusion, no vision, this girl. In spite of the absence of any air mask, she was vividly, vitally alive. A living, breathing siren, exotic, enticing, maddening. Lorelei—Lorelei of space! The opening words of an ancient Terrestrial poem ran through his head. "*Ich weiss nicht, was soll es bedeuten*—I know not what it betokens." He, Gorn, did not know, either! Did not, somehow, care. Rooted to the spot, he stared fixedly, unable to wrench his eyes from the girl's terrible beauty.

SUDDENLY Jensen stumbled out of the air lock, drifted toward the vision, his face ablaze with strange, ecstatic bliss. It was at this moment that Gorn noticed the dark thing behind the woman—a dark spot through which no stars gleamed. Black emptiness, terrifying in its absolute vacuity. Jensen was near the girl now, his arms outstretched, his face flushed from holding his breath in the airless void. Just as he was about to embrace the girl, however, her hand shot out, striking his shoulder. Under the impetus of the blow the *Cosmic's* mate drifted helplessly toward the strange patch of darkness at the woman's back. Then he disappeared in it.

Gorn, watching, swore under his breath. So, no doubt, the others had gone, drawn, one by one, from the ship. First Broul, at the controls, would fall under the spell, head the *Cosmic* toward the danger spot, and step out, a victim of the Lorelei. After him, the others, like soulless robots. And now—Gorn spun about. Perhaps if he could reach the emergency controls, get the ship away from this mad blot in space—He ran along the companionway to the control room, reached for the rocket acceleration lever. And then he felt rather than heard the honey-sweet voice of the Lorelei—calling—calling to him through space-vacuum, reinforced steel and glass!

Like a man in a trance, Gorn turned away. The gripping hypnotic attraction drove all other thoughts from his mind, left only an overpowering desire to be near the golden-haired girl outside. He walked mechanically toward the air lock, seized the lever. Ancient music of savage drums and elfin pipes buzzed through his brain. *She* was waiting outside, waiting with soft arms and warm, enticing lips. Unreasoning strength surged through him; he felt as though he could break down the walls of the ship with his bare hands if necessary in order to reach, be near her. Taking a deep breath, he tore open the door of the air lock, leaped into the void.

The girl was standing there, smiling at him, her white body in sharp silhouette against the empty black blot behind her. Gorn floated across the few yards of space, swept her into his arms. As he bent to kiss those bright-red lips, his face met a cold, invisible wall. He tried to brush it aside—his numbed brain had difficulty in concentrating—his lungs seemed ready to burst. The girl gripped his arm tightly, while with her free hand she pointed a tiny tube toward the *Cosmic*. A thin jet of flame shot from the little cylinder, its recoil propelling them both backward into the black veil at their rear. Gorn had confused impressions of falling through a vast, choking void and then everything became blurred.

TWO VOICES, oddly different in quality, were the first things to register upon Gorn's returning senses. One of them, warm and rich as old wine, belonged, he felt certain, to the Lorelei. The other, although unmistakably feminine, was harsh, grating. He opened his eyes cautiously, closed them again. "—glad it's over," the girl was saying. "That glass oxygen mask hurt my face. And I want to get back to Thantu."

"Back to a life of idleness," the harsh

voice snapped. "Perhaps, if you find time between your eternal dancing and singing, you'll mention to the Directress how well my smoke screen worked in concealing the ship."

"Of course, Zael." The Lorelei laughed liling. "But what queer creatures these men are! I've never seen one before, except at a distance. So big and muscular and rough! Rather like you Labs, only—well, more interesting. We know from our teachers that they are an inferior, although necessary, form of life—yet they seem to me somehow attractive, disturbing. They make you think old, forgotten thoughts—dream ancient dreams—"

"I know." The harsh voice became momentarily soft. "I, too, have felt—Bah, what am I saying! Honest work and peace, these are our aims on Thantu! As a lazy, stupid Bearer you will learn enough of men before you get through. Suffering, and a form of madness, they bring! Aye, and sometimes death! Study this man, if he attracts you so greatly. I'm going up to the control room! But remember, when he regains consciousness, he must be placed in the hold with the others! So the Directress orders!" Crisp footsteps, ringing on the metal floor of a companionway, grew fainter and fainter.

Gorn lay still, his mind a tangle of troubled thoughts. So the black blot had been no more than a smoke screen, concealing a spaceship! The Lorelei had thrust them into its air lock, where, no doubt, waiting hands had drawn them in, prisoners. Thantu—a world, from what he had just heard, inimical to men! Directress—Labs—Bearers—What did these terms mean? He lay motionless, eyes closed, trying to piece together the odds and ends of this strange puzzle. It would be safer, perhaps, to pretend he was still unconscious.

A touch of soft fingers upon his face interrupted his thoughts. Through

partly lidded eyes he could see the Lorelei regarding his stubbly cheeks with evident curiosity.

"Hello!" He lurched to his feet, grinning.

"Oh!" The golden-haired girl stepped backward in confusion. "You must go below—to the hold—with the others."

Gorn glanced about. They were in the main saloon of a spaceship—but what a ship! Ancient, rust-flaked bulkheads, low crossbeamed ceiling, bare iron-plated floor. A veritable *Flying Dutchman* of the space-lanes. Dingy electric bulbs instead of the new, brilliant radium globes! Archaic bull's-eye portholes in place of the large, modern glassite observation windows! Heavy handholds on the walls which at first puzzled him until he remembered that the early vessels were so equipped because of the uncertainty of the gyroscopic control. From beneath came the clank and clatter of antiquated engines. The old ship plunged forward with a lurching, bucking motion.

"SOME Ark!" Gorn chuckled. Then, turning to the girl: "I'm Gorn, captain of the Martian freighter *Cosmic*. Maybe you'll explain what this is all about."

"No," the Lorelei whispered. "The Directress has forbidden conversation with captives." She pointed to a hatchway with an iron ladder leading down in the hold. "Go. At once!"

"And suppose I don't?" Gorn demanded, eying her narrowly.

The girl gave him a warm, radiant smile. "But you will, won't you?" she murmured. "If I ask it?"

Gorn bit his lip. The irresistible attraction of the creature—that was her strength! Impossible to refuse, no matter what she asked. He moved obediently toward the ladder. Suddenly the Lorelei laughed.

"How strange!" she exclaimed. "You

are infinitely more powerful than I am. And surely you do not wish to go below—yet you obey me!”

Gorn spun about, facing her.

“Don’t you understand?” he muttered. “Don’t you realize that you’re beautiful and I’m mad about you? Can’t resist your cursed spell! You’ve no business playing siren for this Directress or whoever it is! You belong in the worlds of men—the worlds of love, of conquest, of adventure!”

“Love—conquest—adventure?” the girl repeated, frowning. “What are they?”

“You don’t know?” Gorn laughed harshly.

“How should I? There are no men on Thantu. Except a very few, and I’ve never met any of them—yet.”

Gorn looked at her, puzzled.

“What is a Lab?” he asked. “I heard you talking—”

“Why—a laborer, of course. A female worker. Nearly all the women in Thantu belong to the worker class.”

“I see. And Bearers? What are they?”

“Why—the mothers—the ones selected to bear children—perpetuate the race.”

“And you are a Bearer?”

“Not yet. But I shall be, later on.”

Gorn was still confused. The thing seemed unreal, fantastic. A world in which men did not rule.

“What is this love you spoke of?” the girl went on.

“Why—an attraction between a man and a woman. In my world, when two people have this feeling for each other they get married.”

“Married? I don’t understand.”

“They agree to live together as one for the rest of their lives. Have a home—children—”

“Astonishing! And conquest? What is that?”

“The subjugation of opposing forces! Such as the forces of nature. Conquer-

ing her secrets—putting them to practical use.”

“And adventure?”

“Well, that’s life. A man’s life. Doing, accomplishing things for the joy of it! The excitement. Escape from the monotony of existence. Beating down obstacles. Triumph!”

The golden-haired girl stared down at the floor, her eyes unseeing.

“Love . . . conquest . . . adventure!” she murmured. “We know nothing of those things, on Thantu. Yet I have dreamed—and laughed at myself for doing it. On my country we are raised to obey the Directress. We have no choice.”

“Theckla!” A harsh voice sounded from the doorway. “Talking to a prisoner!”

III.

GORN WHIRLED about. Facing him was the stocky, heavy-limbed woman who had been in the room before. She had close-cropped gray hair; her face was set in thin, bleak lines. The mannish attire she wore, a working suit of some coarse gray material, robbed her of all vestige of femininity. Her calloused hands and lean, muscular arms spoke of years of toil. She was still comparatively young, however, and might even have been attractive had not all suggestion of beauty, of charm, been so harshly suppressed.

“Oh!” The golden-haired girl stepped back, startled. “I was only—”

“Enough!” The woman waved a commanding hand. “You should realize by now that men are no more than beasts! Prain only knows what lies he’s been filling you with! You Bearers are such vain, foolish creatures!”

“Zael!” The girl straightened up with sudden pride. “You forget yourself!”

“Sorry,” the other woman said sullenly. “I’m only trying to carry out the Directress’ orders.” From her belt

she drew an old-fashioned cathode gun. "You, fellow, get below at once!"

Gorn glanced at the weapon, turned toward the ladder, shrugging. In his mad haste to leave the *Cosmic* he had come unarmed.

"Good-by—Theckla!" he said softly.

Then he was climbing down the ladder into the darkness of the hold. Above him the hatch cover slammed shut.

"Gorn!" It was Jensen's voice, somewhere in the black depths below. "We were wondering what happened to you! Been making time with the blonde?"

"Swell chance," Gorn grunted. Then, as his feet touched the floor, he stood still, waiting for his eyes to become accustomed to the gloom. "Everybody here?"

"All ten of us," Broul replied. "Eleven, including yourself. But say, chief, did you ever see such a museum piece as this tub? Look at those freight elevators over there! Hand-gearred chair lifts instead of magnetic hoists! This isn't much better than the original spaceship that took Allison and Kennerly to Luna!"

"Hm-m-m." Gorn remained silent, thinking. The names of the two first daring adventurers of space recalled half-forgotten history lessons to his mind. What was it the woman Zael had said? "Prain only knows—" Somehow that expression—

"Does the name Prain mean anything to you fellows?" he demanded.

"Prain?" Jensen wrinkled his brow in thought. "An early explorer, I believe. About the time of the first Lunar War. Something to do with those queer social movements and cults that sprang up after interplanetary travel first began."

"That's about as close as I can get, too," Gorn admitted. "Still"—he stretched his powerful arms—"at the rate this crate's moving we'll have plenty of time to think it over."

IV.

GORN WAS right. A full month passed with no break in the monotony of their existence. The grim-visaged Zael, pistol in hand, lowered food and water through the hatchway, refused to answer any questions. There were no portholes through which they could see. By the end of the fourth week Gorn was mad from inaction; he paced the dark hold, devising impractical schemes for gaining control of the ship. Like himself, his companions were weaponless. They were listening half-heartedly to his latest wild plan when a heavy jolt sent them spinning to the floor.

"Gods!" Jensen muttered, picking himself up. "A crash! And we cooped up in here—"

"Wait!" Gorn stood still, listening. He nodded slowly. "We're landing! That shock was the old-style single-jet rockets being switched on. You hear! The exhaust roar is forward now instead of aft!"

"Landing!" Jensen repeated. "I wonder what kind of a place we're going to strike? Some rotten little planetoid, I suppose."

Before anyone could speak again there was another jolt, a solid, resounding bump as the ship grounded. A beam of light poured down from above, and Zael's rough voice echoed through the hold.

"Come up slowly, one at a time. And if you want to live, don't try to escape."

Gorn sprang toward the ladder, scrambled up it. In the saloon were four muscular, stern-faced women and the slender Theckla. He had just time to smile at her before he was waved through the open air lock.

As he stepped from the ship Gorn hesitated, blinking momentarily in the unaccustomed but very cold sunlight. Beneath the vessel lay a great sand pit, blackened and fused by the flames from the rocket blasts. A narrow metal gang-

plank ran across the smoking sand to the black, igneous rocks beyond. Gorn glanced curiously about. This new world was not like anything he had seen before. Unutterably bleak to one with a Martian's love for dry, dusty-red plains, green-bordered canals.

There was no doubt, however, about its being a woman's world, to judge from the group awaiting them at the far end of the landing bridge. A detachment of female workers, armed with cathode guns, and wearing a semimilitary uniform of gray trousers, dark-blue jackets, and coarse white shirts all very thick and warm.

Under the direction of Zael and a grim-faced officer with a silver badge upon her flat chest, the prisoners were formed in single file and marched along a black stone-paved highway between lines of guards.

Not such a small world, Gorn thought, if the gravitational effect meant anything; he walked with a feeling of lightness, but it was not marked. Perhaps the question of density had something to do with it, or these dwellers on Thantu understood how to control the force of gravity. He was not enough of a scientist to work the thing out.

Ahead of him, in the distance, a city rose above the level, half-frozen plains. He saw long stretches of buildings, all alike, composed of gleaming black stone—black, no doubt to absorb the dilute solar heat. They made him think of huge dominoes set on edge, with windows instead of white markings. Perhaps it was the drab monotony of the scene that made it so menacing. All was cold, efficient, sterile. Only one structure broke the otherwise regular skyline. A tall, templelike building rearing its sable dome some hundreds of feet above the rest of the city.

AS THEY WALKED along the stone-paved avenue toward the gates,

half a mile away, Gorn began to feel in better spirits. The pale rays of the sun after their long captivity, the fresh, although bitter-cold, air, the ability to move about, brought a sense of well-being, of sudden exhilaration. He strode ahead humming the lines of Xoal's song:

*"Oh, a girl on every planet, so what matter where I go?
There's a dusky maid on Venus, a pale blonde on Io!"*

Then he was aware of the girl Theckla at his elbow.

"So that's the thing you spoke about called love?" she said scornfully. "A girl on every planet—"

"No," Gorn grinned. "Only amusement. I—"

"Then don't sing about it." Her voice was cold. "I find this mention of the stupid women of your backward worlds annoying."

Gorn's grin broadened.

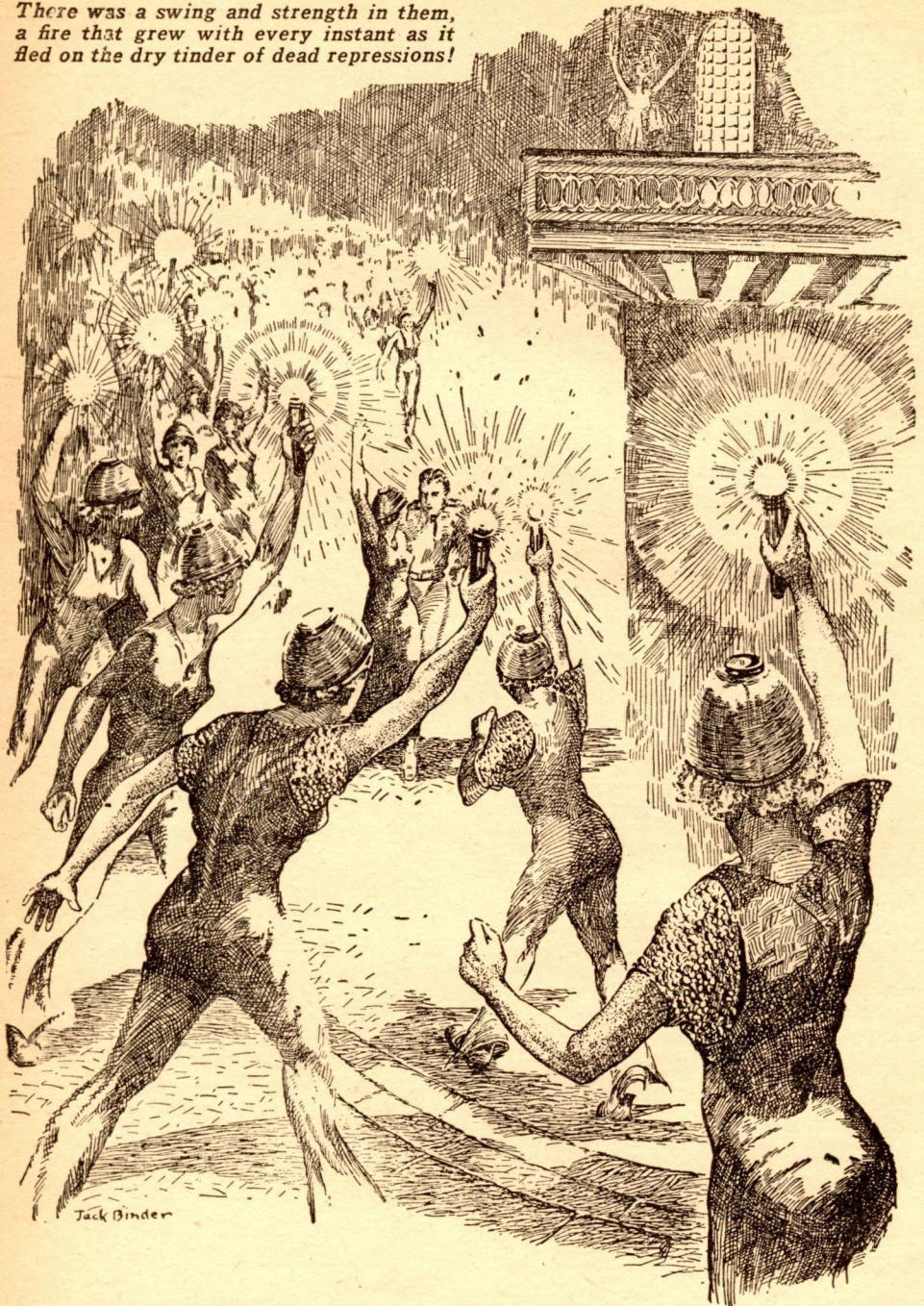
"That," he said softly, "sounds very much like our—love. There's the makings of a real woman in you, Theckla, once you forget all this nonsense you've been taught. Some day we'll get a little spaceship of our own, just big enough for two. You and I together, with the great white stars swinging by, and the flare of the rockets lighting up the void behind us. I'll show you the *fayeh* blossoms of the Martian spring, the luminous crystal caverns of Mercury, the silver seas of Venus. You and I, with all of space to explore!"

"All of space!" the girl whispered. "New worlds, new people, new—"

"Silence, prisoners!" Zael snapped from the head of the column. "Theckla, walk here with me!"

For the rest of the journey Gorn failed to observe his surroundings closely. Dreams that he thought he had lost in his first few years in space were returning to him. Dreams of a life quite apart from old Xoal's with its

*There was a swing and strength in them,
a fire that grew with every instant as it
fled on the dry tinder of dead repressions!*



Jack Binder

liquor, its dancing girls, its bottle-throwing, free-swinging brawls. He smiled, shook his head. Not for a leather-necked adventurer like him, this girl.

It was not until they were entering the city that Gorn awoke from his mirage of thoughts. The towering black walls at close quarters were even more

ominous, oppressive. The empty, silent streets filled him with queer forebodings. The whole place seemed devoted to industry. Through the windows of the buildings he could see row upon row of machines of every sort, tended by gaunt, tired-faced women in workers' suits. No hurrying throngs in the glassed-over, artificially heated streets. Only the Labs, each at her appointed task, toiling in endless engine rooms, machine shops, factories. At one point they were halted by a stream of workers pouring into a building, while others, relieved, walked wearily toward what looked like a dormitory across the street. Work, eat, sleep, work! This seemed to be the life of the women of Thantu! The life of worker bees in a vast human hive! To Gorn it seemed horrible in its stark sterility.

V.

THE LITTLE procession halted at last before the gates of the great domed central building. The home of the queen bee, Gorn thought, with a humorless grin.

Here were evidences of pomp, of splendor. Sentinels in gaudy uniforms. Officers. Servitors. All gray, elderly females. Over the door a huge golden bas-relief, depicting the struggle of women to break their fetters, cast off their galling, man-made chains.

Up, then, in spacious elevators, to a floor high above the city. A broad black-and-silver corridor, leading to a vast central hall. They went toward it in silence, save for the clatter of feet on the marble-paved floor.

Gorn gazed at his companions. Their faces were eager with the hope for new adventure, yet marked by traces of doubt. These cold, sexless workers seemed horribly, cruelly efficient.

A bronze gate was thrown open. Gorn and his comrades found themselves in an immense circular room. Its lofty,

vaulted ceiling rose to shadowy heights far above. Rays of warm, purple light, emanating from the high center of the dome, made bright oblongs upon the polished marble floor. About three sides of the hall ran a balcony, a massive, roomy gallery crowded with young and beautiful girls. Girls not unlike Theckla, except that they seemed more indolent and languorous as they lay back on their cushioned couches whispering among themselves, laughing softly, while obedient workers fanned them, brought them drinks. The glances they bestowed upon the prisoners were coolly curious, filled with half-veiled contempt.

At the fourth side of the room was a raised dais surmounted by an ornate throne of a pale-blue luminous metal entirely new to Gorn. Above and behind the dais were rich hangings, tapestries depicting women workers in every field of industry. Upon the throne sat a stern figure, apparently the Directress, the ruler of Thantu. Thin, bony, hatchet-faced, her gray hair was cut close, her pale, deep eyes held a fanatical glitter. Her uniform was similar to that of the militant guards who attended her, except for a silver triangle upon her forehead.

"The captives!" Zael said, saluting.

"You have done well." The Directress nodded. "Bring them here."

When the eleven men had been lined up at the foot of the throne, the woman stared at them for fully a minute in silence, frowning. Suddenly she raised her hand.

"Prisoners!" Her voice was crisp, cold. "As Directress of Thantu I owe you no explanations, yet I am disposed to make some. In the Terrestrial year 2017, following the successful Allison-Kennerly flight to Luna, the nations of Earth, incited by the rich deposits of radium on the Moon, went to war to decide who should control them. Our beloved Founder and first Directress, Anna Prain, lost her father, mother and

two sisters in that war. Blown to bits by a bomb, as a sacrifice to man's brutality and greed!

"Sick with grief, she conceived the idea of creating a woman's world somewhere out in space—a world free from strife. Men, she rightly argued, were primitive beasts, living only to conquer, to kill, to destroy. She decided to found a world of her own, a place of peace, contentment, repose.

"With the assistance of Allison—Kennerly had been killed in the war—she realized her dream. Collecting a group of kindred spirits, like herself disgusted with man's savagery, she set out, in the finest spaceship then obtainable, into the void.

"I NEED NOT trouble to tell you of the hardships and dangers this little band of explorers encountered before they reached and settled on Thantu. Owing to its small size, its bitter climate, the nature of its orbit, Anna Prain decided there was little danger of its being invaded by man. Here we have built an ideal community, modeled on the life of the bee.

"Two men accompanied Anna Prain's expedition, since she knew that without such beings for reproductive purposes her little colony would soon die out. Since then, all male children have been destroyed at birth, except the few needed for carrying on the race. These, confined in isolated dormitories to prevent them from inflicting our workers with their cruel ideas, serve only as Drones. At the same time we have built up a special group, known as Bearers, whose function it is to act as mothers of our young. Thus, with our population regulated to the desired level, we lead a peaceful, orderly, hard-working existence. These Bearer women, in return for the sacrifice they make, are raised in every luxury, exempt from daily toil. Consequently, while good Bearers, they are weak physically and

undeveloped mentally. Like this one"—the Directress pointed to Theckla—"soft, feminine, worthless, except for their one special purpose in life.

"Of recent years, however," the ruler of Thantu went on, "our original stock has been running down, due to the Drones' idle and confined existence. We realize the need of new and more vigorous blood strains. Refitting Mother Prain's ship, we sent it out to make captives, equipped with certain of our Bearers trained in telepathic thought projection, in the hypnotism of sex. These women are experts in the art of controlling the minds and the emotions of men. Thus we secured the crew of the *Maria Stella*—and now, you. Your life on Thantu will be an isolated one. You will be treated like rare animals, confined in cages, for to us you are no better than they. Insubordination will be punished with death. The guards will take you to your cells. But wait." The grim-faced Directress surveyed the small group of men. With a motion of her hand she singled out Rhiner, the wizened old navigator, and Balt, the fat, bowlegged cook. "Destroy those two. The others we keep!"

"Destroy—" Gorm leaped forward, his eyes blazing. "You would kill these men? For no reason!"

"On other worlds, men kill other men for no reason! And women and children as well. From perverted notions of conquest, of greed, of pride! Yet when I decide to do away with two, from sound economic reasons, you object! Just like a man—illogical, emotional, primitive! Fools! Take them away!" She waved her jeweled hand.

Rhiner had begun to whimper; he was weak and old. Balt cursed violently, backing away from his guards.

"By Jupiter, you won't!" Gorm roared. "Come on, fellows!"

The little group surged forward, fists upraised. On her brilliant throne the Directress laughed cynically.

"Don't harm them!" she exclaimed.

Gorn and his comrades, massing to protect Rhiner and Balt, found themselves confronted by a line of cathode pistols. Muscular guards dragged the two men beyond their reach. Gorn, striking out blindly, saw the blue flash of the cathode rays, felt a spasm of pain as the discharge seared his arm. More guards closed about him; he went down, fighting, under a rain of blows. From beyond the bronze gates he heard the quick discharge of two ray-guns, heard Rhiner's and Balt's despairing death screams. Then, as a pistol butt descended on his head, he lost consciousness.

VI.

GORN WOKE UP in a small, cell-like room, windowless, but furnished with every luxury. A soft, pleasant bed, chairs, tables, rugs— Only the bars at the door reminded him that he was a prisoner, caged.

His arm, skillfully bound, seemed almost healed, but his head ached. He went to the door, peered through the iron grating. A husky, wheezing voice came to him from across the hall. He looked up, saw a man whom he recognized as Hult, once mate of the *Maria Stella*.

Gross, obscene-looking, he stood at the door of his cell grinning through the bars. In one hand he held a bottle of wine; his head lolled from side to side.

"Welcome to Paradise, Gorn, old blaster!" he cried. "Better a captive on Thantu than a king on Mars, say I."

"Paradise!" Gorn muttered contemptuously. "For drunken bums like you, maybe! Not for me!"

"Wonderful!" the man laughed. "No work to do. No bills to pay. Anything you want for the asking. Just—wine, women and song. That's the life!"

Gorn turned away in disgust. A

thin-faced guard arrived with food, fruits, wine.

"How long have I been here?" he asked her.

"Ten days. You had a brain concussion and were out of your head. There was also the wound in your arm. It is better now. In another week you should be well."

"And then?" Gorn asked.

The woman shook her head.

"I'm not supposed to talk to prisoners," she said, and went out.

Gorn shuddered with fear. Fear of becoming like the man across the corridor. A Drone. He sat still, chin in hand, racking his brains vainly in the hope of finding some way of escape.

Memories of his past adventurous life crowded his brain; a kaleidoscope of swiftly moving events.

The time he had stumbled upon the mist-people of Venus, lived among them for a month as king, until the rescue expedition located him. The battle with the giant armored sloths of Mercury which had left the deep scars upon his cheeks. The day he had won the Terra-Mars Space Race, when his skillful handling of the *Cosmic* enabled him to beat the finest racing craft of three planets. The fight with the asteroid pirates, the gun-running at Europa, the fury of the meteor storms— Was all this now gone, forever? Captured by a group of women—women armed only with ancient, primitive weapons! What a joke that would make back at Mercis, where he had the reputation of being the toughest, smartest spaceman of them all! And the sleek *Cosmic*, bought by his sweat and blood, a derelict in space! Was he never again to follow the unbeaten trails, pit his intelligence and courage against the timeless, limitless void! He stared at the gray wall of his cell, desperate, hopeless.

Presently his fit of dependency wore off and Gorn began to think more and more of Theckla. Memory of her

slim loveliness had stamped itself upon his brain. He knew that he loved her, wanted her for his own. Yet—as a Bearer, she would sooner or later be mated with one of the men in the Dormitory—one of the Drones. Any one. It might even be that beastly fool Hult, across the hall. The thought maddened him. Unless he could escape, rescue her— He fell into a wild, red rage, knew the madness of despair. Like a caged beast he tore at the bars of his cell, shouting furious, incoherent threats. At last worn out, he threw himself on the bed, slept.

THE SOUND of someone calling his name wakened him. He sat up, opened his eyes. A slim, white-clad figure stood outside his cell door.

"Theckla!" he cried, running to the grating. "You here? But suppose the guard—"

"She is a friend! One of us."

"One of us.' What do you mean?"

"I'll explain. But speak softly, in order not to rouse the other Drones. It's death for me, if I'm caught here."

"Good Lord!" Gorn reached through the bars, gripped the girl's hand. "A woman after my own heart. But what's up?"

"The guard tonight is one of the younger workers. I've been talking to them, these younger groups, while you were ill. Telling them what you told me, about freedom for women, in a man's world. About conquest, adventure love!"

"Are they interested?"

"Tremendously. For a long time they've been sick of this drab, mechanical existence. The endless, maddening monotony of it. But knowing nothing of any other life, up to now, they've had nothing else to look forward to—nothing to fight toward. Now, after hearing what I've learned from you, they are ready to rebel. But there is no one to command them—tell them

what to do. Will you lead them, Gorn? Lead—us!"

"I'll try—if you can get me out of this cage! But what do they want—"

"First, you must speak to them. Give them courage, purpose and direction. For a long time we have wanted to fight away from what we have. But that was too negative—too insubstantial and unreal. Give them—give us—a picture of something to fight toward. Something to live for—as you have given it to me."

"Theckla!" Gorn's eyes glowed, his heart leaped with joy.

"Tomorrow night, then. During the first watch after the lights are out. Be ready."

"I'll be ready!" Gorn whispered back, flexing his great muscles in anticipation.

"Now I must go—before the guards shift. But one thing more. Many of the workers—most of them, in fact—have never seen a man. Only the Bearers have that—honor!" The girl gave a little scornful laugh. "So do not be surprised if at first they seem—afraid."

Then, as the footsteps of the guard sounded nearer, Theckla whirled about, ran swiftly along the corridor, and vanished among its shadows.

For many minutes after she had gone Gorn stood motionless by the door of his cell. A great change had come over him. His shoulders were erect, his eyes bright. For the first time since his imprisonment he was able to hope.

THROUGHOUT the short Than-tuan day Gorn paced his cell in a fever of impatience. When, at last, night swept over the dormitory, he stationed himself beside the grating, peered anxiously along the murky corridor. Long, dragging minutes passed. Theckla was late. Sweat broke out upon his face, his arms. Could the Directress have learned of the plot, arrested its principals? Had the guard been changed?

A soft patter of footsteps interrupted his panicky thoughts. Theckla, her eyes bright with excitement, paused before the door of his cell.

"Quiet!" she murmured, fumbling with a bunch of keys. Then, as the door swung open. "Follow me!"

Gorn stepped into the hallway. The occupants of the other cells were asleep, the dormitory cloaked in darkness. A wave of exultation swept over him. Free! Nothing mattered now. Even to die fighting was better than life of any kind within the confines of four stone walls. He strode lightly after Theckla, glancing warily from side to side to see if anyone were on watch.

As they reached the far end of the corridor, Theckla turned, went up to the wall. At the pressure of her shoulder, one of the large stone panels swung inward, revealing a wide, heavily carpeted gallery.

"The passage through which the men are taken to the Bearers," she whispered. "Only a few trusted guards know its location."

Gorn nodded, followed her in silence through a maze of dark passageways, narrow staircases. Row after row of doors, through the panels of which they could hear languorous voices, soft laughter, the tinkle of music. At length Theckla paused before an iron portal, unbarred it. Gorn felt a rush of cold air, stepped forward into a little street at the rear of the Central Unit. As the iron door swung shut behind them, two tall young Labs stepped from the shadows.

"Is everything in readiness?" Theckla asked eagerly.

"Delegations from each unit will meet at midnight in the *formalium* mills, where the night shift will be at work. The Feminists and other secret organizations have pledged their support. Is there anything else?"

"No." Theckla shook her head. "We—"

"Wait!" Gorn glanced up at the towering Central Unit. "My men!"

"Of course! I had forgotten!" She turned to the two Labs. "Remain here! If the decision is favorable, you will take advantage of the confusion to release the crew of the *Cosmic!* Good luck! Come, Gorn!"

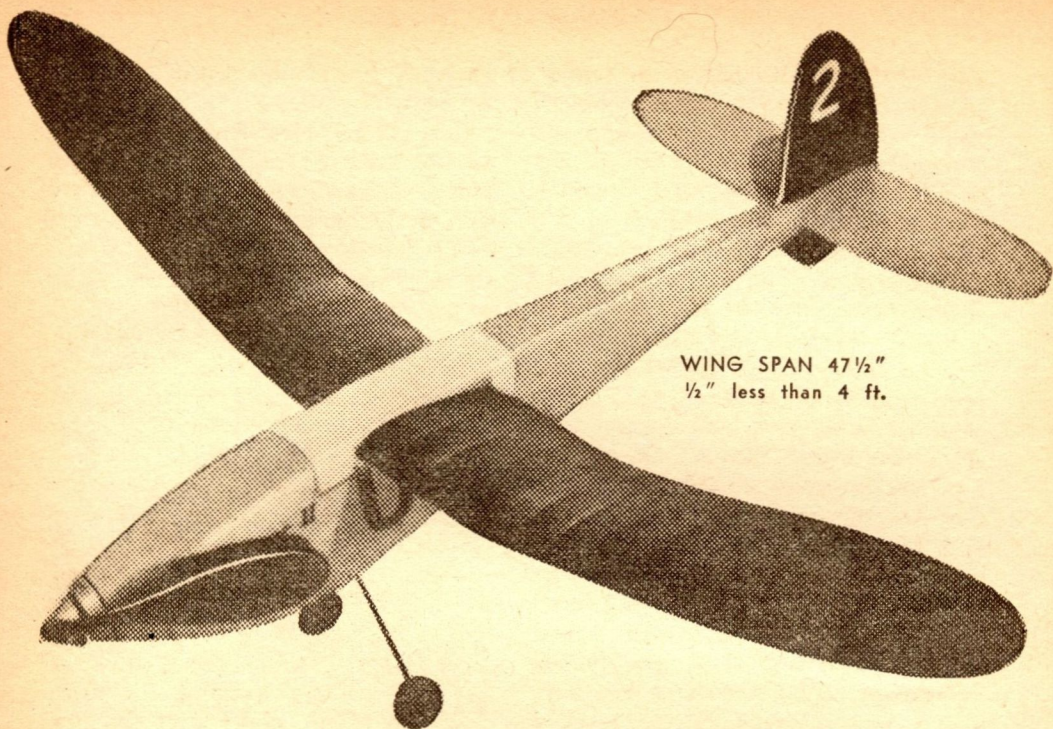
To Gorn, as they raced through the black, deserted streets, it was all unreal, fantastic. He followed Theckla blindly, marveling at the force, the dynamic vitality of the girl. In a man's world he might have taken the lead; but here, where for centuries men had been regarded as inferior beings, he could only follow.

As they passed the great dormitories Gorn could feel the tension, the restlessness that seemed to hang over them. From within the buildings he heard murmurs, excited whisperings, the nervous movement of sleepless, expectant crowds.

Suddenly Theckla turned, approached a huge, sable structure from within which the rumble and roar of machinery was audible. The Lab at the door, recognizing Theckla, waved them in. A moment later they were standing on a broad metal platform, where busy timekeepers and checkers pursued their monotonous tasks.

VII.

THE ROOM was bigger, Gorn realized, than even the vast rocket-ship hangars at Mercis. Along one side of it, great arched furnaces flared with gusts of ruddy flame, spewing forth streams of white-hot, molten metal, sprays of dazzling sparks. Massive, rather crude, machinery towered above them, trioxine converters, soot-blackened caldrons, ponderous cranes gulping huge mouthfuls of the blue *formalium* ore to disgorge into the melting pots. Green smoke, mingled with steam and strange mephitic gases, swirled up-



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ward to the dim reaches of the ceiling, hung overhead in a choking noxious cloud. The workshop rang with the clangor of a thousand hammers, the sizzle and hiss of bubbling metal, the clank and clatter of gigantic engines.

Grimy, sweat-stained women swarmed about the furnaces, each at her appointed task, like ants. In the red light of the fires, their shadows, immense, distorted, crawled like evil monsters across the black, windowless walls. Here a group of overalled workers, bare arms knotted with muscle, faces stamped with the bitter mark of toil, threw great chunks of slag into the battered, wheezing dump cars. Here gaunt stokers, reeling from the fetid, searing breath of the furnaces, prodded the flames into a hissing, crackling rage. Bodies black with smoke, eyes dull with weariness, they labored, overcoming the clumsiness of their antiquated processes by killing, maddening labor. Women broken on the wheel of efficiency—women stripped of their yielding softness, hardened, even as the metal with which they worked, to a cold, inflexible temper. Gorn glanced at Theckla, slim, alluring, feminine, then back at the grim, bleak creatures in that blazing hell of flame and soot and sweat. Suddenly he realized that the Labs were singing, humming a monotonous air, barely audible above the thunder of the machines, the roar of the furnaces. Plaintive, hopeless, the melody seemed composed of broken hopes, of futile, primitive longings. It made Gorn think of the half-formed dreams of childhood, of the endless yearnings of youth, of the dim memories of age. And always the song held that aching, tortured monotony of despair, growing louder and louder until it drowned out all thoughts, until the brain of the listener throbbed like a harp string. Gorn shuddered, turned away as a brawny forewoman approached them.

"The Bearer Theckla?" she inquired, wiping the moisture from her forehead.

Then, as Theckla nodded: "And this is—a man?"

Gorn straightened up defensively under the woman's curious, rather contemptuous gaze, squared his shoulders, hooked his thumbs over his broad leather belt.

"He is a man," Theckla replied, glancing shyly at Gorn.

For just an instant the Lab's eyes softened wistfully. Abruptly she turned to the timekeeper.

"Midnight?" she asked.

THE TIMEKEEPER nodded, her gnarled fingers tightening about a heavy switch. A shrill siren, screaming like a woman in pain, filled the huge room with noise. At once the melancholy song of the Laborers died away. Hammers clattered to the floor, conveyors halted in midair, grinding machinery slowed to a stop. Then from the great main entrance a crowd of women poured into the room, groups of twenty or fifty, woodworkers, weavers, stonemasons, chemists, electricians—representatives of a hundred different crafts and trades, until the vast mill was a sea of faces, drab, weary faces, all fixed on the timekeeper's platform where Theckla stood. For some moments the girl remained motionless. At length, as the eager, jostling groups became quiet, she stepped to the edge of the platform, straight and erect as a slim white taper, her yellow hair shimmering like a wind-blown flame.

"Women of Thantu!" Theckla's clear sweet voice echoed through the silent workshop. "As I have told you before, your life here is a dreary round of toil with nothing to relieve it! You have no past to remember—no future to dream of! Neither joy, nor pain, nor triumph nor failure. The centuries of Thantu's existence have shown no scientific advancement, no progress of any sort. On other worlds men have struggled upward toward some ultimate goal;

we who have stood still in the long climb, refused to advance further, become traitors, not only to ourselves, but to our destiny as women!"

A roar of approval met these words. Suddenly Zael, very mannish in her gray overalls, elbowed her way forward.

"Interesting from an economic standpoint," she exclaimed, "but we want to know what this new mode of living would mean to *us*—to individuals!"

"Listen, then!" Theckla leaned forward, her eyes brilliant. "It will mean personal liberty! Freedom! Homes of your own, to furnish as you see fit, instead of numbered cells in a human beehive! Husbands, to lift the burden of toil from your shoulders! Children, to hold to your breasts! Love and understanding! But above all, freedom! Freedom of choice! Freedom even to fail! You—"

"Wait! Wait a moment!" A brawny, soot-smearing metalworker pushed forward, carrying a massive sledge. "Men, you say, will take our place in the factories! I've heard about these men—flabby, pale creatures living lives of indolence and ease. What man could wield this sledge?" Whirling the heavy hammer over her head, she smashed it down upon a block of *formalium*.

Murmurs of assent swept the smoky hall. "Aye! She's right! How can weak men do our work? We would be forced to support them in idleness!"

Gorn stepped from the shadows, moved to the edge of the platform.

"I am one of those indolent creatures!" he cried harshly.

"A man! A man!" The excited whispers ran from mouth to mouth; all eyes fastened upon him, tall and powerful, his craggy face ruddy in the fire-light.

Suddenly Gorn leaped from the platform to the floor, snatched the ponderous sledge from the metalworker's hand!

Once, twice, he swung it about his head, then, with all the might of his Herculean frame, brought it crashing down upon the block of *formalium*.

A cry of admiration went up. The big piece of blue metal had been split in two!

"DO YOU STILL doubt man's strength?" Gorn's deep laugh echoed through the mill. "Is there enough of women left in you to want man's protection, man's kisses! Will you remain slaves—or be women?" His voice held a taunting challenge. "Men do not hesitate to fight for freedom! Will you?"

"No!" Long-smoldering sparks of discontent, of rebellion, suddenly broke into white-hot flame, sweeping the hall in a blaze of mob fury. "Fight! Fight! Fight for our rights as women!"

In an instant the great workshop was a seething, uncontrollable mass of humanity. Dull eyes gleamed with fierce hatred; shrill voices mingled in a cacophony of sound; calloused hands snatched up hammers, bars, wrenches, anything that might serve as a weapon. Gorn, fighting his way toward Theckla, held her close as they were swept through the great entrance door.

There was no need to notify the women in the dormitories of their decision. The shouts, the clanging of weapons, brought them swarming into the crowded streets. Hundreds, thousands, tens of thousands, an irresistible tide surging toward the Central Unit. As if by magic, countless *mellurium* torches blazed into flame, their lurid orange light brilliantly illuminating the dark, shadowy streets. The patter of myriad feet was all but drowned out by the cries, the hoarse chanting of the workers. Gorn, exultant with the fire of battle, laughed deeply. Onward, swiftly, relentlessly. Here a gray, withered old Lab, clutching a butcher's knife; here a sturdy stonemason, brandishing

a heavy mallet. The song of the Laborers, pitched to a wild, triumphant note, echoed through the city, a battle hymn of freedom.

The Directress had had a busy evening going over the plans for a new Unit. Now, at eleven o'clock, she stood on the balcony of her apartment, smiled in satisfaction at the still, dark city. Brushing a speck of dust from her glittering uniform, she stepped inside, crossed the boudoir. At the door she paused momentarily, glanced toward a curiously shaped lever within a thick glass case; then, shrugging, she drew back the heavy portières, entered the banquet hall.

The room was strewn with flowers, fragile, scented blossoms. Shifting, varicolored lights made vivid patterns upon the inlaid walls. The long tables were laden with fruit, pink Thantuan *zoynas*, fresh from the hothouses, tiny *lotos* with their odor of spices, crushed *myrrh-melons* steeped in fragrant perfumes. Golden Thantuan wine, sparkling in its goblets of blue *formalium*. *Solene* plates, crystalloid decanters, constantly refilled by soft-footed Labs. In silver cages the purple *markeets* spread their brilliant plumage, trilled softly, begging for crumbs. From some hidden source came the strains of music, sensual, barbaric music, throbbing like the hot blood of passion. Musky incense tinged the air with blue smoke, giving the scene the vague unreality of a dream.

About the many tables were grouped the Bearers, their firm young bodies gleaming like old ivory beneath sheer silken robes. Languorous, exotic, they lay back upon heaps of cushions, adding their soft voices, their lilting laughter to the sound of the music. As the Directress appeared at the head of the broad stone staircase, they stood up, arms raised.

"Be seated, my children." The ruler of Thantu smiled a greeting. "Tonight

we feast to beauty. Beauty such as only women can create, unlike the harsh ugliness of man. Let there be joy among us!"

Descending the steps, she took her place at the head of the large central table, raised her jeweled goblet. "To Thantu!" she cried. "A world of peace!"

THE BANQUET was drawing to a close when a weird sound reached their ears. The "Song of the Laborers"! No longer a peaceful drone of bees—it was more the furious humming of angry wasps! The Directress leaped to her feet, listening. Suddenly an attendant burst into the room, her face gray with fear.

"Excellency! The Labs are surrounding the palace! Revolt!"

The Directress' voice rose sharp and clear above the shrieks of the frightened Bearers. "They have no weapons! Let the guards shoot them down!"

Turning, she mounted the broad stone staircase behind her, passed through the portières.

Outside, the infuriated Labs swept on toward the Central Unit. Their *mel-lurium* torches stabbed the darkness like a thousand baleful eyes. Onward, through the wide streets, into the square before the palace. They had scarcely a hundred yards to go when the guardswomen ran out to meet them, cathode guns crackling. The square suddenly became a hell of dazzling blue flame. A sickening stench of burned flesh filled the air; smoke from charred bodies hung over the plaza like a pall. Yet in spite of the wide swaths cut in their ranks the Labs did not waver. Again the guardswomen fired, and still the Labs pressed forward over a barricade of bodies. Panic seized the guards. Throwing down their weapons, they fled into the Unit.

Gorn, his hair singed close by a cathode blast, leaped forward. "Down

with the doors!" he cried. "Quickly!"

Two Labs armed with sledges advanced toward the great golden doors. Before they could strike, however, there was a stream of light from above and a tall, resplendent figure appeared on the balcony.

"Women of Thantu!" she cried. "Come to your senses! Seize this man and this girl! Destroy them before our world is destroyed!" The Directress pointed to the sprawling bodies below. "Already masculine cruelty and brutality have come into our peaceful existence! The man who leads you has brought conflict, destruction, death!"

"And love!" roared Gorn. "Which is every woman's birthright! Freedom to choose, for these creatures you have enslaved!"

"He lies!" the Directress cried. "Back to your cells!"

"No!" the crowd thundered. "Down with the doors! Freedom!" The Labs surged forward; hammers clanged upon the great golden portals.

"Fools!" The Directress' eyes gleamed with a wild fanatic light. "Do you think I am unprepared? For years this building, the city beyond it have been mined! Ever since I began to see dissatisfaction among my people! Since Anna Prain's experiment has failed, I prefer to fail with it—to destroy her world!" She turned toward the bedroom. "Within six paces of where I stand there is a lever—"

The Directress broke off, her face convulsed with rage. The doorway behind her was blocked by a group of lean, bronzed men. The crew of the *Cosmic*, armed with weapons wrested from panic-stricken guards! With a desperate movement the Directress reached for the gun at her belt. Before she could draw it, the spacemen fired. The Directress staggered backward, her body enveloped in blue flame, toppled from the balcony.

In the choked streets beyond, the

"Song of the Laborers" rose to a swelling crescendo, the triumphal pæan of a free people.

THE OLD PRAIN spaceship, brightly burnished and refitted, manned by the *Cosmic's* crew, lay like a huge silver beetle on the edge of the shallow sand pit. A great crowd of the women of Thantu covered the surrounding fields to watch their emissaries to the lands of man depart. Zael, looking surprisingly feminine in a dress borrowed from one of the Bearers, smiled at Gorn and Theckla standing in the entrance of the air lock.

"When you return," she exclaimed, "the dormitories will have been torn down, their material used for—homes."

"Good." Gorn nodded. "And we'll bring a fleet of ships carrying scientists, mechanics, teachers. Men. Inside of three months—"

"No hurry," Zael laughed. "We want a little time to let our hair grow long." She backed away hastily as the motors began to hum.

Gorn and Theckla waved, closed the door of the air lock. With a blast of flame the ship shot upward, became a speck in the pale sky. Zael brushed a grain of sand from her white dress, buffed her nails on her sleeve. It was good, she reflected, to be a woman.

In the air lock high above, Gorn was staring at Theckla with troubled eyes.

"You don't understand," he said. "I'm an old space rover, known in every bar and dive this side of Jupiter. I'm scarred and ugly, lacking in fine manners, fine ways. On Mars you'll see young, handsome lads. You'll be foolish—" The words died on his lips as she swayed close to him. And then Gorn, the two-fisted, hard-boiled spacehand, was kissing her with all the reverent tenderness of a youth in the throes of his first love.

"Lorelei!" he whispered softly.



OIL

BY DON WIRE

OIL

A man may be schedule-nutty, a driver, but in a sense, space itself is schedule-nutty—

TEN MILLION dollars in cargo! Red Lawrence let the millions roll around on his tongue. It had a good taste. Then he swallowed. Two seconds before, he had heard that amount repeated five times, and with considerable vehemence. And even now Timothy was muttering it under his breath, as he paced back and forth in the narrow control room like a hunted tiger. Bob Timothy, stanch and big, and for five years commander of the freighter *Europa*. Maybe that wasn't much, because the *Europa* wasn't much, but when you figured that over a period of a year she hauled *techina* weed from Mars to Earth that amounted to over twenty million dollars in solid, yellow gold—well—Not that the cargo would bring twenty million dollars on Earth. It wouldn't even bring ten dollars! Free distribution of the drug compounded from the healing juices of the plant would soon follow to untold numbers of cancer sufferers when the ship docked. Aside from a space-man's quarterly pay, there wasn't any profit in that. But there was satisfaction. Satisfaction in knowing that your ship was recognized throughout the lanes of space as the "Mercy Ship."

Still, there were illegal ports—Ganymede, Io, and fourteen or fifteen on Venus—where the millions could be collected for such a cargo. And there were certain members of the crew of the *Europa* who had one eye on the illegal port and the other on the ten million dollars.

That's what worried Timothy!

"CAN'T I make you understand? I got a mutiny brewing! Hotter'n Japanese tea! And another thing! Just where

in the name of blue bolts did you pick up that crew, Lawrence?" Timothy had stopped pacing and was giving his heavy jaws free play. His gray eyes flashed like polished chrome.

Lawrence was sitting smoking his last cigarette, and playing with the tinfoil of the empty package. He was recalling school days, when that wad would have put a bump on the back of any teacher's neck. Timothy's sudden outburst made him raise his head, blanked out certain pleasant memories.

"Sorry you don't like them," he said, his voice bitter. "I don't myself. But is it my fault if you have to make repairs, and fall behind schedule? Is it my fault if the gang outward bound get pickled and lose themselves? Is it my fault if I have to snatch anything in the shape of a man to get a crew at the last moment? No!"

"Yes, it is!" Timothy roared with increased volume. "And by the tail of a comet I'm putting you in complete charge of them! Get that?"

"Just a little. But I wouldn't get excited, Tim. Why don't you—"

"Why don't I what? Listen—" Timothy screwed his face up into hard knots. "I said there was a mutiny brewing down there, didn't I? I mean it! And you're supposed to be junior officer in command of this ship, aren't you? Yes! Well, now your in command—of the rear end! Now get to hell out of here, and sit on those grease monkeys until you get some work out of them!"

"Tim, if I didn't love you, and didn't know you were a man of your word, I wouldn't believe you, but—"

Lawrence left the room in a hurry with a boot in the seat of his pants. He

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grunted and grinned as Timothy slammed the door, and began stamping his feet on the metal floor plates. But when he noticed a few of the men about him, his grin hardened.

"Say, bud." Lawrence advanced to the slim form of a slant-eyed individual leaning against the breather of an air-conditioning unit. A cigarette protruded from his lips, and blue smoke curling from his thin nostrils sucked into the grating of the breather. Lawrence extended two long fingers. The cigarette was on the floor, and the man was standing straight up tense and alert.

"No smoking when your tending things like this," Lawrence said gently. "If you want a weed, go to the wash room. Savvy?"

"Yeah. No harm done."

"Not yet. But there will be—if I catch you smoking here again."

The man shifted—then he caught the hardness in those brown eyes. He relaxed to his former position.

Another across the room on the rocket intercepting banks was perched on a box with his bulbous nose in a dime novel. Lawrence snatched the magazine from him and threw it on the floor.

"What happens when the pressure in the combustion chambers becomes unequal, and a rocket tube gets a double dose of fuel?" Lawrence watched a sneer curl the flabby lips.

"I don't know, and what's more, I don't care."

"You don't know, and you don't care, huh? Well, I'll tell you. The tube blows off, and ignites the one beside it. In a couple of seconds it's just like a package of firecrackers popping. Only by then you ain't. Get me?"

"Yeah. So what?"

"So what? This's what!" Lawrence grabbed the man by the fat of his neck, and hauled him a foot off the floor. "Now listen, you little beetle! Keep those pop-eyes of yours on those signal lights, and be damn sure you intercept the right tube if and when the time comes!"

Lawrence noticed the others had been watching him. He also noticed that they

were quick to resume their duties as he walked on across the room.

THE CENTRAL relay room was empty when Lawrence entered it. There was one man leaning against the center supporting stanchion, but as far as Lawrence was concerned, it was still empty. That one man happened to be Fred Keith, second junior officer in command. Distinctly Lawrence's pet aversion, he could be found any place on the ship at any time—providing he wasn't wanted at that place at that particular time.

Tall and graceful, Keith was at ease in any weather, fair or foul. He had a smoothness, a swing, that grated on a sane man's nerves like sand rubbed between two pieces of glass. Lawrence thought he was quite daffy, and cussed himself for not threading his way around the room through the gangways instead of taking a short cut.

"Hello, stupid." Lawrence came up to the stanchion, and squatted on the base.

"My prayers have been answered, may God rest my soul—if I go to the right place." Keith grinned broadly, showed flashing white teeth that matched the immaculateness of his tailored uniform. "I just been hoping you'd come along."

"And why?"

"I been hearing things. Thusly. 'I got a mutiny brewing! Hotter'n Japanese tea. Now get to hell out of here, and sit on those grease monkeys until you get some work out of them!'"

Lawrence shot to his feet and his face matched the red flame of his hair. "How the— Where were you, under my chair?"

"Nope, not quite that near."

"In the chart room! You slithering weasel! Right next door!"

Keith laughed loud and long. "The walls are thin, my boy! Watch what you say when the enemy's lurking!"

Lawrence sat down again. "Well, anyhow," he said quietly, "when the Old

Man gets as riled up as he was over a thing like that, you can be mighty sure he isn't just blowing off steam—as per habit. It gets me, though. You'd think the whole, silly pack of 'em would be glad to get free passage back to Earth with a pay check waiting when they arrived. There wasn't one of 'em that wasn't stranded at that God-forsaken Martian port. Lord knows how long they had been there—and Lord knows how long they would have stayed."

"That's human nature," Keith offered. "Take me, for instance. I met a couple of dames once. One was a blonde, the other a brunette. The blonde practically fell over herself trying to rope me. The brunette wouldn't even give me the eye. I went screwy over the brunette, and made a colossal ass out of myself trying to rate her. And it's the same way with these guys. They got passage back home, and a pay check right in their hands. But the ten million dollars is a little out of reach. Watch 'em. They'll break their legs trying to grab off that money."

"Yeah, and it'll be nothing short of a miracle if we get this tub into berth a month over schedule the way they're putting out. There's another thing about being late I don't like. And the Old Man sends me—"

"Wait a minute!" Keith turned, his back to Lawrence, and his eyes on the gangway leading aft to the engine room. Lawrence followed his gaze. He saw nothing, but he heard. At first it was a whisper—a whisper that did not belong in the droning of smoothly turning engines. Then a rasping, jagged off-beat without rhythm or tempo, a beat that should not be. The noise increased, found volume and strength until a roaring crescendo of sound smote their ears and made them shudder. It was the barbaric, maddening screech of unleashed power—power that had broken its bonds, and was raising havoc!

LAWRENCE jumped to his feet, grabbed Keith by the arm, and started for the gangway at a dogtrot. The vibrations of thundering, laboring engines seeped into their minds. They seemed to hear the torturing throb of each piston as it was frantically driven by uncontrolled energy. That meant but one thing.

"Those fatheads!" Lawrence hissed with anger thick in his voice. "They must think those tri-bank relays are a bunch of piano keys! They're pouring power meant for fifteen outlets into nothing but a two-way conductor! The blundering—"

"You don't have to tell me," Keith interrupted jaggily. "I been around here awhile, too. And what's the hurry? Sounds nice. A bit like Chopin or Beethoven—although rather harsh."

"Yes, rather!" The sound was louder now. They were drawing nearer the engine room.

"This ought to scare the mutiny out of 'em," Keith suggested. "Blamed if there isn't enough racket to run you clean off the ship! My mother told me about things like this. Why didn't I—"

He finished the sentence with his teeth jammed into the floor plates, and his head whirling crazily from a bump that was slowly gaining proportions. Everything was blotted out as one deafening roar after another pressed into his eardrums. He winced with pain at the ever-changing pressure.

Suddenly everything was still—breathlessly still. Keith rolled over, saw Lawrence sitting against the wall wiping blood from his nose.

"You guess first," Keith managed, but his voice was serious. His attempt at humor had only been habitual.

"I don't need to guess," Lawrence answered. "I know. At least one piston to each engine gone. You'll find them somewhere up in the rafters still trying to push through the outer hull. And the oil pans—torn to shreds! Five thou-

sand gallons to each pan. Three engines—three pans—and it isn't cold, either!"

"Then the men—" Keith stopped himself. He felt a prickly sensation run the length of his spine.

"Yeah—the men? We'll be short-handed from now on. But you can take it from me—the mutiny's squelched. The same as our chances of reaching dock are."

"But—they must have died a horrible death!"

"It was quick. Anyhow, what of it?" Lawrence got to his feet, angry with himself and with Keith for talking about it. You had to be hard to hold a berth in space. If men got killed, it was their own fault. Still, it must have been a terrifying sight to watch living flesh being eaten away by hot, stinking oil!

LAWRENCE was watching the gangway. A hundred yards down, two men burst from a side ramp and stumbled toward him. They were wild-eyed and panicky. Dirty oil glistened on their torn clothing.

"Shut up, both of you!" Lawrence stopped them before they even had a chance to open their mouths. "We know what happened, and a lot of blubbering isn't going to do any good! And those men in there can't be saved, so don't ask me to try! They're dead already! Now get up to the central relay room, and I'll back-hand the first one who opens his mouth the wrong way!"

"Yes, I think you boys better leave. I'd like to talk to these two gentlemen alone." Timothy's big body had miraculously drifted up without anyone being aware of it. He stood on his magnetic shoes as firm and unwavering as the steel trusses of his ship. And the fire in his eyes looked like the fire of that steel as it was first being born from crude iron.

"I put you in command of the rear end of this ship, Lawrence," he said. "And the first thing I see you're trying



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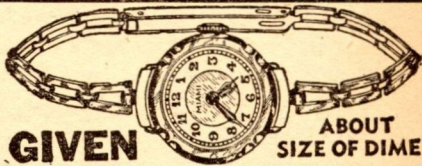
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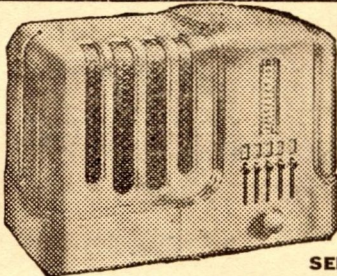
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to pull a little act of secession on me! What're you going to do, fly your end around in space without mine?"

"Damn it all, Tim, it happened before I even got a chance to get back there! I can't keep an eye on the whole outfit at once, can I?"

"If you can't, you better learn how to!" Timothy squatted, and brought his face to within an inch of Lawrence's. "Listen, redhead, I put you in command of this end! You rounded up this bunch of flapdoodles, so I'm letting you take care of them! I ought to toss you through a port and let you drift back to Mars, but instead I'm leaving you in command! Why? Because it'll be a pleasure to watch you get yourself out of this pickle so this ship docks on schedule! Now on your feet, brother, and get this ship moving, or else—"

When Lawrence looked up, Timothy had gone. He glanced at Keith, and he thought the grin on his face was one of the most horrible ones he had ever seen. It was a mixture of humor—and of sudden death. Keith couldn't stomach that, so he went on down to the lower engine room. He had too much of an imagination, so he moved over to the corner and relieved himself.

The oil wasn't long in seeping through the closed doors of the engine room. According to government specifications, all doors on a spaceship should maintain a perfect seal when shut tight. Evidently the government had never been in such a situation as this.

At first it was just a smear on the jam, and then a sluggish trickle under the threshold. But it was enough to tell Lawrence that if they didn't want oil from one end of the ship to the other, those doors had to be sealed. So calking wax was brought out, and three precious hours were spent in stopping the flow. The sweat of nervous hands mixed with the yellow stickiness of melted wax as the ship hung motionless—like a windjammer caught in the doldrums, awaiting a wisp of breeze to fill her sagging sails. But the windjammer had one advantage.

If she didn't arrive on schedule, nobody gave a damn, because she seldom did anyhow. But the mercy ship was clocked to the minute, and if she arrived much over that minute, she took her next trip out manned by a new crew, from skipper on down. Further, if a spaceship doesn't follow a plotted orbit, other things do.

LAWRENCE didn't want much of a hand in the affair. He wasn't yellow, but the task of removing dead bodies burned beyond recognition wasn't to his taste. But the room had to be drained first, so the amount of damage could be estimated and the necessary repairs made. And he knew it had to be done quickly. He could help there. But it was all so hopeless. With the pans demolished, how could they ever hope to cool the bearings, and do it at once? You couldn't just smear it on like grease. No. One thing at a time, thought Lawrence. Drain the room, and then worry about the engines.

"You'd better give us a hand, Keith." Lawrence shoved his head into the chart room where Keith was beginning to check his angles to account for the drift of the ship when she started up again—if she did.

"Why?" Keith continued scribbling.

"Don't ask silly questions! C'mon, leave that till later."

"I'd rather not."

"Suit yourself." Lawrence slammed the door. He hadn't gone half a dozen yards before Keith was at his side.

"Here's the best way to go at it, Red," Keith said, in a matter-of-fact voice. "Get down in between the inner and outer hull—course you'll have to wear suits—and install three or four outlets right up through the bottom of the floor plates of the engine room. Then you can break out a section of the outer hull, drop your hoses down, and let her whistle."

Lawrence stopped dead. A crimson

tide flowed up his neck, and penetrated to the roots of his hair. "I was treasuring a somewhat similar idea myself, fella," he said. "As a matter of fact, that little bit of originality you just threw at me happens to be strictly my idea! And if you'll search back through that withered gray matter of yours, you'll find that said idea was related indirectly to you in a lecture I gave for a final exam at the engineering school! Or were you asleep?"

"Definitely not! Come to think of it, it does seem familiar. Oh, well! You said you wanted a hand."

"That's right. In fact, you can give two of 'em. One with a wrench in it, the other with a screwdriver."

Seven black figures emerged from a trapdoor in the floor just as a gong clanged and announced the midnight hour. Haggard faces, bleary eyes, dragging feet—they all told the same story. Eighteen hours without sleep. With nothing but a ten-minute break to grab a cup of coffee. Eighteen hours of twisting and wrenching—a bolt here, a stud there; a washer—not the kind that fits in a garden hose, but a six-foot circle of steel, three inches thick.

Lawrence and Keith stood aside as the other five hauled lengths of hose up through the trapdoor.

"Put those hoses back in the lockers, and then report to me in the engine room," Lawrence instructed them.

"Cripes, pal, can't we get a little shut-eye!"

"No!" Lawrence wheeled on the one who had spoken. "Forget all about sleep! You can do that when we get back! And if we don't get back—you'll sleep forever!"

The man bit his lower lip, slung a hose over his shoulder, and moved off.

"I wouldn't be too hard on them, Red," Keith said. "Remember, the heart of a nation is its people."

"And the heart of this nation hap-

pens to be its engines. If I can get them working, I can tuck all those youngsters in bed and drive the tub home myself. If I don't—and—"

KEITH and Lawrence fingered the cold metal of the pistons. Lifeless. Dead. Out of thirty-six, ten of them had torn loose from the bearings and were somewhere up above trying to push through the rafters. Another five had split from the connecting rods and had popped halfway out from the cylinders. They noticed with satisfaction that the walls had not been scored. Things had happened too quick.

As they walked about, they heard the crunch and grating of charred metal beneath their feet. What was left of the oil pans was merely a ridge around the gaskets where tool-steel bolts had held even through that inferno.

"How many more," Keith said quietly.

"How many more what?" Lawrence asked.

"Men. Men against metal. Soft flesh against tempered steel. The damage done and estimated—but how do we get out of it? How do we feed those bearings? How do we hold oil without pans?"

"Yeah. We haven't got sheet metal enough to bend new ones."

"Not a chance. What we have is only for minor hull repairs."

"Yeah."

Lawrence sat down. His hands pressed to the floor, and came away thick with oil. Oil! Damn the stuff! There were three fifteen-thousand-gallon tanks beyond the bulkhead he was looking at. Fresh, dirty, black oil! And yet it might just as well be at the core of the Sun! You couldn't use it because you couldn't hold it in! Maybe you could drop it on like rain. That was smart. The only trouble was, by the time that little gang of men moved the tanks over the engines into position,

space would be frozen over. And Lawrence knew it had to be done—done anyhow—*now*.

Yet it had been easy enough to drain the smelly stuff out of the room. All they did was connect hoses—

Lawrence lunged to his feet. The attempt sent him sprawling full length in the air. He groveled a moment, then finally stood firm. It was a hundred yards of tough going to the wall phone near the door. Keith slid along behind. You could walk on the stuff with the magnet shoes, but running was another thing.

"Hello, Tim! Tim! Get the wax out of your ears, this is hot!"

Keith heard a roar, and then a flow of language that sounded like the right stuff. Lawrence was frowning—trying desperately to get a word in edgewise.

"Rome wasn't built in a day, was it?" the redhead yelled. "No! Then listen to this before you start sowing your oats! I want permission to use the oil in those reserve tanks! Every last ounce of it! What? . . . No, I'm not going swimming, and what I drink's not quite as strong as that! Look close, now! Shut up, Tim, and let me talk! . . . Oh! All right! Goo'-by!"

"You didn't get far, did you?" Keith flashed a smile.

"Far enough, brother, far enough. He says go the limit—as long as I don't dig our grave any deeper. If I do, he says I'll be the first one in it."

"I believe him."

"Yeah."

A door in the opposite wall banged open and the five hands marched in. Lawrence walked over to them.

"Go back and get the hoses. Longer ones. And three two-way couplings for the reserve tanks. Install them, connect the hoses, and break them through the bulkhead. And if you see any more men around, tell them to come down here."

Five pair of bloodshot eyes opened

wide. There was deep silence, then somebody said: "He's nuts!"

LAWRENCE counted the seconds by the watch strapped to his wrist. He was already up to ten, and nothing had happened yet. That is, nothing material. The scream of frenzied engines laboring against overwhelming odds was what made him so concerned over the passage of time. He allowed fifteen seconds from the throwing of the master switch for trouble to occur. After that he wouldn't worry—maybe.

He breathed deep and leaned over the rail of the forty-foot-high catwalk. Down there was black hell. A Dante's inferno of men, metal and oil. Six black streams of it, two to an engine, under enormous pressure that kept the men back a hundred feet. They couldn't get close enough. Just then Keith entered from the circular stairway, so Lawrence told him.

"There's lots of force behind that oil, but if they move in any closer they'll be blown back through the opposite wall. Those driving cams just throw it out in spray. It barely wets 'em. Look at 'em! It must be like wrestling a python to keep those hoses under control! There's three men on each hose now, and it's all they can do to hold the nozzle up!"

"Have a sandwich?" Keith took two wrapped in wax paper from his jacket pocket. Both leaned over the rail and munched. "The acceleration of the ship is back at 1-G, so the oil's draining. That's some help."

Below them they watched those blackimps fight with a strength and courage that had always been there, but had only lately been brought out. Maybe it was the desire to exist, to live and breathe sweet air again. Maybe it was man's crazy determination when he's against forces he can't lick and hasn't had time to think about. It was sweat and toil and slave! Hold up that nozzle and suck air when you can! Pour that oil in, don't give an inch! Stand your

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Lawrence thought of all this. He shut his eyes as if to not only blank out the sight, but also the thought. But you couldn't close your ears. You could plug them, but there wasn't the plug made that would bring relief from that noise. But he could fix this—fix it right—when he had time. Now they had a schedule that—

"If I could only get in it!" He said with a strange thickness in his voice. "But no! I'm supposed to think! I'm supposed to find a way out! I'm supposed to watch and direct—while those poor devils see nothing but black filth, and hear nothing but the screams of a thousand devils! We've got a schedule to—"

"Take it easy, Red." Keith laid a hand on Lawrence's shoulder. "Why don't you catch forty winks? Might do—"

"They don't sleep, do they? They've been on their feet for twenty-four hours—and this is only the beginning. No. But let's go down to the chartroom. Work might help some. Have a cigarette?"

LAWRENCE decided it would be a pleasure to go mad. Those engines were mad. The men were mad. Why couldn't they all be mad? Maybe they

would be—all except Keith. You couldn't ruffle that boy. His plumage was too slick. There should be more like him. Either that or he shouldn't be here at all.

The break came after six hours. Six hours in which the *Europa* had torn off a good distance. And at full speed it should be expected. But she'd added to her speed, too, with that steady acceleration.

Lawrence was on the catwalk looking at the same scene, hearing the same noise, thinking the same thoughts. Add it all together and you were a cinch for anybody's bughouse. Suddenly he heard a new wave of sound, like somebody churning milk full of broken bottles. He thought it was funny at first, but when he caught the rasp and clang of engines that have taken all they can stand, he felt different. A dozen quick steps took him to the circular stair. And with each step the shrill whine gathered volume. It was an insane rhythm, a jagged beat that drove needles of pain through his aching ears.

When he burst into the engine room the men had fallen back. They still grasped their hoses, but none were mindful where the oil shot to.

He gyrated wildly across the floor, trying to keep his feet, but having little success. He wore no suction-cup shoes like the men. It might have been funny, but no one laughed. Finally he felt the master switch in his hand. He knifed it down and stood like a corpse as the sound died and gave way to the swishing of the streams of oil. A pleasant trickle. He had never heard anything so melodious in his life.

"Close your valves." It was just a whisper, but the men heard. "Then go to bed. I'll call you when I need you."

There was an audible sigh that came from nine sticky throats. But one dared to relax muscles that had been locked and cramped into rigidity. Instantly a black snake of unleashed fury reared into

the stinking air. The men stood frozen as the hose swayed like a cobra. And the spell was not broken until two of them had felt the fangs of that thrashing demon. The hose descended in a half circle, came down level with the floor, and whipped across the room. Two crumpled bodies lay in its path. And another hose joined in the death-dealing with its companion.

The men backed to the walls and cowered in the corners, all trying with some measure of success to ward off the sting of those snakes with the powerful streams of oil from their own hoses. They knew better than to close their own valves. And there was not one of them who could leave to close the main valve on the reserve tanks. They had just seen what would happen if one of them was to relax his grip.

Lawrence knew they couldn't last long. Those hoses never struck twice in the same place. In a matter of seconds those steel nozzles would find them. And when they did—

Lawrence saw a way out in the form of a door leading through the bulkhead to the reserve tanks. To get to it he would either have to cross the room or slink around the walls. One way was quicker than the other. He started across the floor, bent double.

His eyes stung from the oil that hung in the air like a thin spray. But he had to keep them open. He had to see. He had to watch every movement of those writhing tentacles. He even had to anticipate where they would be next. And some inner sense told him the spot he was on would soon be slashed across by those spouting nozzles. He sprawled on the floor, tried to press himself into the plates. He heard the swish of air, and felt, rather than saw, those hoses twisting and curling above him. Suddenly a stream of oil shot into his face. He fought for breath he could not get. Then he felt the bite of hard metal on his arm, and pain flooded up into his shoulder.

The rest of the way across the floor was a nightmare of writhing shapes. But he reached the bulkhead, stumbled



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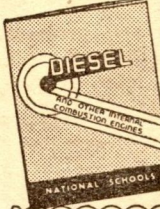
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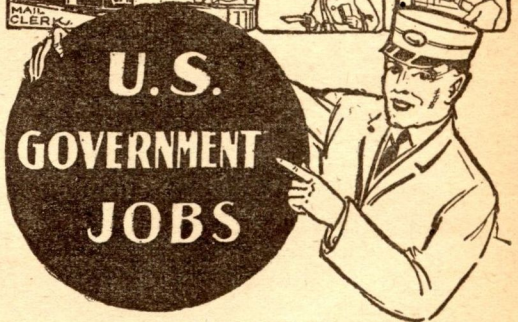
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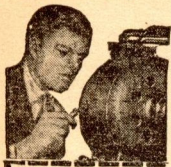
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through the door, and collapsed with his body across the shut-off valve. He urged every ounce of strength remaining in him into his one good arm. Slowly the wheel turned—years passed—time meant nothing—until the valve closed and the wheel jammed tight.

"If you had brains, you'd be a good man, redhead."

Lawrence heard the words through a haze of tumultuous thought. He struggled desperately to break through that murky curtain that was enshrouding him. Was he blind? No. There were two figures beside him. One big, the other slim.

Suddenly his eyes snapped open, and he saw the flashing smile of Fred Keith. The Old Man was standing beside him. He was even grinning. That was something.

"How do you feel, Red?" Keith asked. "Fine." Lawrence looked around. "Say, ain't this something! All tucked in bed, clean white sheets—and even a table with an ash tray on it! Light me a cigarette, will you, Fred?"

Lawrence took a deep puff. "Well, out with it. I take it we're not still wallowing around out in space."

"Nope," Keith answered. "We're only ten thousand miles out from Earth—and on schedule! We've been driving at full speed to make up for our loss."

"How did you—"
"As I said before," Timothy put in, "you'd be a good man if you had brains."

"Say, there's something fishy here! How about those engines? How about the oil? Don't tell me your still spraying it on with hoses?"

"Definitely not. That wasn't a very practical method, Red. Nevertheless, I commend you for trying it. It takes guts to even think of it."

"Then what did you do?"
"We just stripped a few plates from the inner hull, and fashioned new pans. Like we should have to spare. They're just as good, if not better, than the old

ones. Five hours' work had them in place, and the engines turning over without a hitch."

Lawrence eased back on the pillow and nodded. "Yeah. That's right. I was gonna do that, but I figured it would have taken about six hours to set it up, and we'd have been too much behind schedule."

Timothy glared at him. "As I said before, you'd be a good man if you had brains—judgment. What in the name of the Periodic Comets do you mean you were going to do that? And haven't you better sense than to risk blowing those injector engines and the ship all over space with any such horrible makeshift for the sake of a schedule?"

"Man, I'd forgive you for not thinking of that pan repair. I did forgive you! I put you down for the *Europa's* new skipper, on her next trip, but by the Holy Screaming Comet, I won't forgive bad judgment!"

"Next skipper!" Lawrence sat up suddenly. "What—what's the matter, Timothy? Why, you're the best skipper in—"

"Don't worry about me. I'm retiring. I've had enough of this damned racket. Thirty years in space makes a man want to grab him a world and hold on hard. And the Interplanetary Commerce placed the responsibility of finding the *Europa* a new skipper in my hands. And I picked you, damme! And you turn out schedule-nutty!"

Lawrence looked up at him, looked at Keith, and grinned. "Yeah, schedule-

nutty. What are schedules for, out there, eh? What are course-plotters for, out there, eh, Keith?"

Keith looked puzzled and made vague motions. Suddenly they stopped, his face went white, and he gulped. Skipper Timothy looked at him, frowned hard, then his eyes popped wide in queer startlement. "Gabraldi's 2085-IV," said the two, in perfect chorus.

"Yeah," said Lawrence, easing back. "Gabraldi's 2085-IV. That's the name. A ship may get off schedule, but you can't stop the rest of the Solar System just for that. Out there, you hit schedule, or other schedules you can't change hit you. Like that comet. Six hours fixin' a new oil pan out of the inner hull, and we'd be part of that great Screamin' Comet you're always cussin' about, Timothy.

"You don't do the plotting, so you forgot it. Keith here got too excited to remember it. But you were screaming about pink comets, periodic comets, and assorted comets so much I couldn't forget. And I still think that squirt-gun system was good enough for a while."

"I thought it was sloppy, myself," said Timothy, his bull-roar reduced to a gentle avalanche-rumble, "and I was posting you for skipper because you made a gang of the cast-off scum of Mars do miracles. That's the main thing—a skipper that can make a crew do work when work's got to be done. You did that, Lawrence. But you're a better man than I thought. Schedule-nutty!" He grinned and held out a knotted, oil-stained paw.

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Concerning "Gravity Plates."

Dear Mr. Campbell:

My recent article on "Orbits, Take-offs and Landings" brought me several letters from readers of Astounding Science-Fiction. Among these letters, there is one asking a question which I'd like to answer in public by means of your Science Discussions column. This question reads (in a somewhat condensed form): "How would the orbits of spaceships look if they were equipped with gravity plates?"

"Gravity Plates," I take it, is supposed to mean layers of a material that has the fabulous and apparently advantageous property of shielding the spaceship against the gravitational influence of whatever heavenly bodies happen to be around. To answer the most obvious part of the question first, I have to state that, even in such a case, the orbits would not be straight lines. The spaceship would always possess the combined motions of Earth's orbital velocity and of Earth's daily rotational velocity. Exactly how the orbits would look is hard to say; one could probably apply some of the work done by Bengt Stromgren (re: rectified three-body-problem, third body without mass) to them.

The main point is, however, that it is in all probability one of the "forbidden" questions. The readers will know what I mean: one of those questions that are "sense-free" as philosophers call it, like, for example, how one could square the circle without having to resort to the quantity "pi" and how one would have to proceed to build a *perpetuum mobile*. In fact, I feel obliged to deny the possibility of "gravity plates" and to classify them in the same category as the perpetual motion machine, i.e., in the category of things that are impossible by definition.

Sad to say that no less a personage than H. G. Wells started it with his novel about "The First Men in the Moon," where Mr. Cavor invents his "cavorite" that is opaque to gravity. As may be found in the novel itself, Wells (or Cavor) did some imagining as to what could be done with cavorite even if space travel were not contemplated. The heaviest loads could be lifted dangling from a rotting piece of straw if only a thin plate of cavorite were placed between the load and the surface of the Earth. In fact, one would need ropes to tie the load down, be-

cause it would tend to float upward like a balloon.

The only question is whether one could place a sheet of cavorite (or whatever the author likes to call it) between the load and the surface of the Earth, even assuming that cavorite were in existence.

Now things begin to get complicated. On the surface of the Earth we enjoy a certain gravity potential, practically the same in every spot of the planet's surface—which is, by the way, the reason why travel and transportation by means of wheeled vehicles is efficient or, at least, can be made efficient. But in the gravity-shadow of a piece of cavorite another potential (zero) prevails. This means that in placing a load inside the gravity shadow, or on top of a sheet of cavorite, one would need all the energy necessary to overcome the difference in gravity potential. Since the difference is assumed to be complete, i.e. normal to zero, the thing would be frightfully inefficient. The difference amounts to about 6.7 million meterkilograms. If only one kilogram should be placed on top of the cavorite sheet, one would need the energy required to lift 6.7 million kilograms one meter! Afterward, of course, you could lift that one kilogram without any need for additional energy. If a man were to try to step upon a sheet of cavorite, he would have to employ as much energy as is needed to impart parabolic velocity to his body. If his muscles were able to do that, he would not need cavorite or a rocket ship or anything at all for space travel (except an oxygen suit); he could jump to the Moon directly.

I do not know whether anybody ever thought of placing a large wheel on top of a sheet of cavorite in such a way that one half of the wheel would be in the gravity shadow and the other half without. Such a wheel would be a beautiful *perpetuum mobile*, and that famous problem would be reduced to the discovery of cavorite. Which shows that cavorite cannot exist, because if it did, the *perpetuum mobile* would become possible and that is impossible by definition.

"With malice toward some" let me say that I also intend this letter to be a warning to authors. Those that have a weakness for throwing planets in their stories and wiping out humanity within a day or so (unfortunately

always excepting their heroes that should be the first to go) have also a weakness for gravity plates. I nurse a faint hope that they might be discouraged a bit.—Willy Ley, 32-18 79th St., Jackson Heights, L. I., N. Y.

Proving Lex Pandro even more of a liar than we thought!

Dear Mr. Campbell:

In Mr. Schere's most entertaining story, "Let Cymbals Ring," in the December Astounding, the time-traveling villain, Lex Pandro, tells how he "went to England and to the time of King Arthur" and found it "amusing to . . . tilt against noble louts carrying a hundred pounds or more of poorly tempered steel." I don't doubt that it would have been amusing, but I'm afraid that Lex was kidding his hearer—which, considering what a sinister customer he was, is credible. Reasons are as follows:

Those who have tried to find a historical basis for the Arthurian romances have posited that Arthur was a leader of the post-Roman Britons (a people of whom we know almost nothing) against the invading Saxons, and lived about 550-600 A.D. Now, the only writer of that time on British affairs whose work has come down is the monk Gildas, who didn't even pretend to be a historian. He says that the British forces were led by one Ambrosius Aurelianus, and beat the Saxons at Badon Hill (location unknown—or rather, claimed to have been every hill in Great Britain with a "b" and a "d" in it). He doesn't mention any Arthur.

The earliest mention of Arthur is in the *Historia Britonum*, written by Nennius about three hundred years later, a work which "consists so largely of miracles, anachronisms, and other absurdities that it is obviously unworthy to be regarded as an authority for any fact whatever." (Raglan.) Nennius doesn't mention Ambrosius, states that Arthur was, not a king, but the general of the British army, and that at the alleged battle of the alleged Badon Hill he personally dispatched nine hundred and sixty of the heathen foemen. That seems a little strong; one of the deadliest hand-to-hand fighters of whom we have record, Richard I of England, never accomplished one-twentieth that much carnage in a single encounter. The later English and Welsh stories have a lot to say about Arthur's conflicts with monsters, et cetera, but don't even mention the Saxons.

Does somebody say that Ambrosius was a real man (doubtful), and that "Arthur" is by some philological magic derived from "Ambrosius" (still more doubtful), and that Ambrosius and King Arthur are therefore "the same"? Consider this hypothetical case: I'm writing a story of the super-titanic-colossal type, involving a war between the galaxies, with the fighters shooting planets at each other for miles. Finally the hero invents an asbestos peashooter enabling his side to shoot whole suns,

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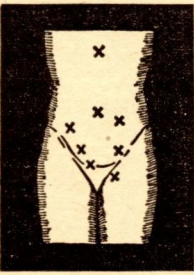


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and wins the war. I want a name for my hero, so I look on the obituary page of the New York Times, and discover the obit of a certain Platyppus McDandruff, who was a corporation lawyer specializing in railroad legislation. I like the name, so my hero becomes Platyppus McDandruff. Would a future historian, comparing my story with the obit of the real Platyppus, be justified in saying that the pea-shooter inventor and the lawyer were "the same"?

As for Arthur's knights: The word *knight* (from the Anglo-Saxon *cniht*) was brought into Britain by the Saxons, and for centuries after that meant simply a hired man-at-arms. It didn't acquire its special meaning, that of a definite rank in the feudal system, admission to which required certain qualifications and a ceremony, until around the Eleventh Century. Knighthood was in flower (if it ever was, which I doubt) about the time of the First Crusade. By the end of the Wars of the Roses (Fifteenth Century), feudalism in England was on its way out, and thereafter knighthood was merely a picturesque affectation.

The hundred-pound suits of armor: The defensive arms of a Sixth-Century soldier consisted of a plain steel cap, a big wooden shield, and, maybe, if the man was lucky, a short shirt of chain-mail. Complete chain armor came in about the time of the Norman Conquest (1066) or later. Plate didn't appear till the latter part of the Fourteenth Century, about the time that cannon were coming into general use for siege work. The really elaborate suits of plate armor weighing fifty pounds or more, occur in the Sixteenth Century, by which time musketeers were having fun shooting holes in them with matchlocks. Tilting, jousting, or whatever you call it, was probably brought into England by the Normans. The Saxons wouldn't have had much use for it, as they fought on foot.

So, you see, we'll have to take Lex's yarn as just another indication of mendacity and general orneriness.—L. Sprague de Camp, 44 East 63rd St., N. Y. C.

Maybe we need a complete article on metallurgy?

Dear Editor:
 To Mr. McCann: I enjoyed your letter concerning the crystallization of metals. Wonder if you can't turn out a nice talk on the new super-powerful magnetic alloy developed by Westinghouse? Then, too, you might tell us of a few more qualities of the metallic single crystals. Electrical flow with the plane and against it, magnetic differences, et cetera.

I'd like to see an explanation of Charles Drew's problem. But does directing the motion of exhaust gases cool them? And if it does, pity the poor jets. Anyway, there'll be no fur pants. I'm sure.

While I'm thinking about it, perhaps illustrators and metal workers should be warned to hold themselves ready: Astounding may have to give us three color illustrations and gold-plated clips yet.

Just happened to think. Supposing a rocket fuel was developed with the exhaust velocity of light. Movement with the velocity of light automatically gives infinite mass.

Infinite mass times exhaust velocity of light equals mass of rocket ship times its velocity. Result: nearly infinite velocity for ship! Paging E. E. Smith. So your hideous speeds are possible, Mr. Smith?—Dale Tarr, R. R. 2, Cloverdale, Ind.

It was decided that the degree of mathematics needed was irrelevant to Astounding.

Dear Mr. Campbell:
 This will be brief—I hope. ("So do we!"—The readers.)

Question one. I am probably revealing myself as one who just never gets the word, but

Just *what* was the final decision in the "Irrelevant" scrap? I got the story a wee bit late, and I often wondered how, and why, and who decided what. Will some kind, long-suffering, good-hearted soul please tell me?

Question two. The Earth spins on its axis. But only with regard to something. In this case, the Sun, I presume. If Earth were all alone in space—no planets, no Sun, no stars—there would be no way of telling whether it spins on its axis or not, would there?

As I understand it, the fact that the Earth does spin makes the gravitational pull at the equator less than at the poles, since at the equator centrifugal force fights the pull of gravity. Right? But in reference to my Earth all alone in space, would the same be true? Would this Earth have an equal gravitational pull at the equator and at the poles, all alone by itself? Remember, it *can't* spin. There is nothing relative to which it could spin. Right?

But what if you suddenly popped it back into the Solar System (I certainly make free with spacial dimensions and a few billion tons of dirt, don't I?) and found that it *was* spinning so fast on its axis, in relation to the Sun, that centrifugal force exploded it? Why didn't it explode when it was the only body in space? Why—

But I'll stop now, before I really start to sound like Baby Snooks.

But will *somebody* please give me the word?—Allan Ingvald Benson, Box 17, U. S. S. California, San Pedro, Calif.

Lines of force may be imaginary, but the concept works, so there's something real behind it. Lines of force from a magnet may not be tangible, but generators calculated on that basis produce tangible power.

Dear Mr. Campbell and Mr. Watson,

It seems that I have made myself misunderstood in my criticism of the science of "Hell Ship." Let me say at once that I believe in the existence of lines of gravitic force, similar to lines of magnetic and electrostatic force, and just as real. Correct so far?

Good. I shall now proceed to quibble for a while, and eventually work up to some more rigorous backing up of my opinions. First of all, I am considering the "line" not as a unit of flux or force, but as a geometrical line.

I admitted that these lines are as real as lines of other force fields. But how real *are* any of them? Webster defines a line of force in the physical sense as a line whose tangent at any point is in the direction of the force at that point; in other words, it is an imaginary, arbitrary line. Many physics texts define it as the path followed by a free particle under the influence of the force. I can find no definition which gives a line of force any more actual physical significance. So I assert that a line of force is a path only, at most, and has no actual, tangible existence, as Burks' story implies. His "spider web," you remember, consisted of a number of fixed, separate lines extending from planet to planet throughout the System, with vacant spaces between.

Let me use a close analogy from terrestrial geography. Suppose there was a ship propelled by a giant solenoid laid parallel to the keel, and being driven along the lines of the Earth's magnetic field. It can start at the north magnetic pole without any trouble to anybody, because the lines are closer together there. The captain can pick out any likely line and follow it south to everybody's satisfaction, even mine.

But when it has almost reached the equator, the main shaft of the engine breaks, the current stops, and the ship drifts with the tide for two hours. If Josh McNab is the skipper, there is nothing he can do but wait patiently until the solenoid runs afoul of another line, so that he can get started again; but I don't believe any present day electrical engineer would have to wait. He'd find that the ship got under way as soon as the current started.

In other words, I don't believe in gaps or "holes" in a force field in empty space. The *Arachne*, however, got caught in one for several hours. She was right in the middle of the Solar System, with planets on every side, yet not one dyne of gravity was acting on her. I disapprove, quoting Sir Isaac Newton as authority.

Since writing the first letter on the subject, I think I have found another fallacy in the lines. I hold that a line of gravitic force never touches more than one body, and hence there *are* no lines running directly from Earth to Mars or any other planet, sun, or star. All the lines starting from the Earth lose themselves in the depths of space, carefully skirting around every object they approach!

Take the Earth and Mars alone. Everybody knows that at a certain point between them, the two attractions balance out, forming a "neutral point." Not only that, but there is a whole surface, extending to infinity on all sides, made up of points whose distances from the two planets are such that the attractions balance. Since lines of force never cross a neutral surface, it looks as if the path of the *Arachne* is indeed critical; so critical as to be non-existent, if it follows the lines exactly. The only way to get to Mars is to shut off the power when approaching the boundary, and gliding across it by momentum. With this system, the aim does not have to be critical at all; once past the boundary at any place, the ship is sure to land on Mars.

The force field looks very much like the field around two similar magnetic poles. It's a pity Burks didn't use this kind of a field in his story; it looks much more spider-webby than his system of lines direct from planet to planet. Another fault is that his lines are stated to *intersect*, which lines of a force field should never do.

Now, worse and worse. Not on my own account this time, but on the authority of Dr. Paul Heyl, of the U. S. Bureau of Standards, who has a very fine article in the August *Scientific Monthly* entitled, "What is Gravity?" (You should try to get him to write an article for *Astounding*, Mr. Campbell. He has the right style and point of view.)

According to one of the theories of relativity, the gravitational force between two bodies is equivalent to inertia, which is a function of their space and time coordinates only. In other words, gravity is something which man can never hope to control without tearing up space and time itself. Experiment corroborates this in a negative way. Gravity has been found to act equally on every kind of material in every kind of state, heated, magnetized, or electrified, that has so far been tested. More than this, no material has been found which can shield from the effects of gravity in the slightest degree. It seems certain that no such material exists on Earth or the Moon, because the numberless eclipses that have occurred in historic times have had no measurable effect on the paths of the Earth or the Moon. Besides this, the effect of the Moon's pull on objects at the Earth's surface can be measured accurately, and are found to be the same even when the Moon is on the other side of the Earth, acting right through it.

In conclusion, I hope our disagreement has been one of definition only, and that when you see where I stand, you will find that I agree with you—Donald West, Acadia University, Wolfville, N. S.

BRASS TACKS

Following are the names of those who correctly diagnosed the error in the Jupiter scene cover of last November's issue. Questionable answers—of the type it might be this, or, again, it might be that—didn't go as fair solutions. Those who solved the question in letters published last month are not included.

W. E. McCracken, 512 Traveler's Hotel, P. O. Box 4007, Houston, Texas.
 Robert V. Woodings, Lorain, Ohio.
 R. L. Heilman, 10857 Wilkins Ave., Los Angeles, Calif.
 K. C. McIntosh, 2618 Marengo St., New Orleans, La.
 Ernst W. Gschwender, 7827 Senator Ave., Detroit, Mich.
 Leon Burg, B. S., 3951 Gouverneur Ave., Bronx, New York, N. Y.
 A. Breitner, 120—4th Ave. West, Calgary, Alta., Canada.
 Contracus, New York City.
 Glen Ward, 285 Smith St., Blackfoot, Idaho.
 Ernest Jones, Mobile, Ala.
 Hugo E. Hanser, 277 Eastern Parkway, Brooklyn, N. Y.
 Ellis Burcaw, Brewster, Ohio.
 D. R. Cummins, Sacramento, Calif.
 F. A. Yorke, 27 North Bailey, Durham, England.
 Alan G. Dunn, 79 Hayton Grove, Hull, Yorks, England.
 Robert K. Holsinger, R. No. 5, Celina, Ohio.
 W. F. Lichtenberger, R. F. D. 5, Decatur, Ill.
 Clifford Francis, Rt. 3, Box 183, Buckhannon, W. Va.
 David McIlwain, 14, Cotswold St., Kensington, Liverpool, 7, England.
 Mary G. Byers, Chaney Farm, R. F. D. 5, Springfield, Ohio.
 Tom Stephenson, 913 So. 12th, Mt. Vernon, Ill.
 John D. Clark, Philadelphia, Pa.
 L. Sprague deCamp, New York City.
 Robert D. Swisher, 15 Ledyard Rd., Winchester, Mass.
 P. Schuyler Miller, Scotia, N. Y.

A magazine by fans, for fans.

Dear Mr. Campbell,
 The second issue of *Spaceways*, out January 1, is a vast improvement over the first—undoubtedly one of the best fan magazines that has been published. In our second issue we have the second part of a serial by Amelia Reynolds Long, "The Dimension Drug"; "The Dead Sleep in Secrecy," a story by Bob Tucker; "The Trip that Failed," a short story of the first space-flight by James Taurasi; "But Would They?" a short fantasy by John Mason; "Looking Backward" by L. B. Farsaci; reviews of the fan mags; letters from the readers; and many other interesting departments and features. In addition to this, our right-hand margins are now smooth, just like a professional, printed magazine.

Spaceways sells for ten cents a copy, or three issues for a quarter. Each month we print the best in fiction and sf. articles by the best-known writers, amateur and professional—but at

the same time we welcome material by those who have never written for fan magazines before. All sorts of material are welcomed—many of the best professional authors received their start writing for fan magazines, so why not try your hand at it? Each issue consists of about 24 large-sized, mimeographed pages. *Spaceways* appears every two months on the dot. News about the pro magazines is included, biographies of authors, and many other features that you can't afford to miss. Send all subscriptions and literary contributions to me today, before you forget!—Harry Warner, Jr., 311 Bryan Place, Hagerstown, Md.

A question for readers: If the people of "Hunger Death" had been represented as speaking differently, wouldn't that have been even more artificial? They would speak the common language of their time, but that would need positive translation for modern ears. In representing Cæsar's speech, would you give him an Italian accent?

Dear Mr. Campbell:

Good issue, I thought while reading. But when I tried to figure out why, after I had finished reading, I couldn't put my finger on any certain thing.

Stories, arranged in order of preference:

- (1) Hunger Death.
- (2) Other Tracks.
- (3) The Command.
- (4) The Tramp.
- (5) The Ceres Affair.
- (6) Orestes Revolt.
- (7) Magician of Dream Valley.
- (8) Sunworld of Soldus.

(1), (2), and (3) practically tied for first place. I had a deuce of a time deciding which was best.

"The Tramp" improves. I didn't like the first part. But this second part seems good. But I'm afraid that it will end like so many stories do—first the event, then the results, then the cancellation of the event—and the world goes on just as it always did. I don't like that.

A bit of criticism. "Hunger Death" had people of approximately five thousand years in the future talking and acting much as they do today. That doesn't seem logical. And in 6938 A. D. would Iowa still have the same name? Who remembers the names of the ancient Egyptian provinces? Perhaps a scholar or two in some musty library.

"Why Rockets Don't Fly" was very good. One article per issue is just right, with little fillers like the piece on the heat gun. That also was good.

Astounding has been improving steadily since you took over, Mr. Campbell. Give us more stories like "Who Goes There?" and "Seeds of the Dusk" and "Ra for the Rajah." Those three are the best of the stories I have read in Astounding for a long time.

And more serials like "Galactic Patrol," please. However, if Smith does another for us, tell him that he can do better than he did with "Patrol." It was superb, but not quite up to his usual standard.

Remember, more like "Who Goes There?"

which was good both for its idea and for its character delineation. More, please, like "Seeds of the Dusk," which was good for its style and for a certain something that escapes me. Perhaps it was a touch, a hint, or haunting melancholy. And more, and more, of stories like unto "Ra for the Rajah," which was an excellent little tale, fast and speedy. I enjoyed Peterson's style immensely, and I know of others, less handy with a typewriter and less free with the postage than I, who also liked it. Probably, if you could check, you would find that the younger and more alive readers liked it, and that the old mossbacks snorted in disapproval. (Psst! The younger ones will probably be reading the magazine longer, despite the higher accident rate among young fools.)

Congratulations, Mr. Campbell, and keep coming!—Allan Ingvold Benson, Box 17, U. S. S. California

*Did he correctly spot the error or not?
The Sun is clearly not behind Jupiter,
but he did recognize the shape of the
shadow as an eclipse shadow misplaced.*

Dear Mr. Campbell:
It isn't very hard to pick the best stories for the November issue.

The first three are fairly close together in merit, but the rest are—well, let's remain friends.

Simak rings the bell again! His "Reunion on Ganymede" takes first place. There's something about a Simak tale—the free, easy style—that makes his characters come to life. In this case it was the lovable "Gramp."

So that I could appreciate "Return of the Prowler" better, I re-read "Prowler of the Wastelands." And I wasn't disappointed. The "Prowler" of today is just as human as the "Prowler" in the April '35 issue. So Harl Vincent carts away second honors.

Although the authors are trying (unsuccessfully) to be humorous of late, "The Einstein Inshoot" was really good. That is, in its basic humor. So—Mr. Bond, here is your third-place ribbon.

What about "The Tramp," you ask? Again I say, "Let's remain friends."

Thanks for giving us the new, well-balanced contents page. It is the best I've seen in science-fiction.

You've probably been deluged with letters, concerning your cover plate, but I'm going to be different. I'll say only about one-tenth of what I feel like saying.

Of course, Jupiter would be invisible with the sun behind it. And that shadow—if it is a shadow—on Jupiter is absurd. Why, it would completely obliterate Jupiter if centered. And cast by Ganymede! Then again, the shadow wouldn't fall that way in space. With your solemn promise, "never again," I'll let it go at that.—Mark Reinsberg, 430 Surf St., Chicago, Ill.

The back issues did go. In fact—they're sold out!

Dear Editor:
The fourth Friday of the month is a holiday for me. On this occasion, I take the little gem of a magazine, make myself comfortable, and tear through it. And I read everything with interest and notice every little detail, every slight change.

But today it is different. What was supposed to be a holiday turned into a day of quiet reading for a few hours and then I reached the point of realization that here was the best issue any magazine (science-fiction, of course) has put out since the advent of this type of literature.

Immediately I contacted all friends and ordered them to purchase the new issue at once. In the evening I went to my colleague's home for a discussion of "our favorite magazine." Then I returned to my home and decided on the "bests" of the issue.

Believe me when I say this November's front cover will be remembered long. It is absolutely,



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and without doubt, the best cover any science-fiction magazine has ever given to the public. "The Einstein Inshoot," by Nelson S. Bond, is great. This new type of writing, sport science-fiction, should, by all means, be developed. After all, sports will play a very large part in the future.

Nat Schachner's new serial is off to a good start. I am always glad to read Schachner's stories. "The Tramp," by Hubbard concludes with the most powerful part of all three installments.

"The Forgiveness of Tenchu Taen," by Kummer, Jr., is a beautifully written story. It deserves much praise.

I am delighted over Earl Vincent's return. Please try and keep him on hand. Rocklynne's story of Dilmo Deni is grand work. "Seaward," by Jameson, is likewise entertaining.

The two novelettes are outstanding. Simak is turning overnight into a top author. More from him. I like his characters a great deal. "The Silver Sphere," by Heckman, begins with suspense and lives up to the illustration.

The article is good, but I had to put my whole mind in it to enjoy it.

About the artists: keep Brown on the cover and give Wesso plenty of work. He is the best interior illustrator of science-fiction.

The new contents page is an improvement. You intend to change the lettering on the cover, so plan it well. The present lettering is outstanding so think before you change it. However, if this new lettering is better, let's have it. Also, do not change the lettering on the end, or side of the magazine. At present, it is the most attractive side of any magazine. The trimmed edges are great. This month they're as smooth as glass.

The readers' letters are becoming more interesting, and I always turn to these pages first.

You should have many requests for back issues in response to your advertisement in this issue. I already have placed my order, and upon receiving them will have January 1935 to date. Each issue is priceless and often I go through them and re-read favorites.

Improvements are coming rapidly and I look forward to 1939 as the greatest year science-fiction has ever seen. The public is becoming conscious of this new and different kind of magazine—Leonard Kramer, 228 East Oglethorpe, Savannah, Georgia

Our apologies for the "funny little trick." The coming of UNKNOWN upset the schedule after the cover was printed but before the magazine was made up. Hubbard and Vincent both coming, though.

Dear Mr. Campbell:

A most unusual issue, Mr. Campbell, a most unusual issue. All the way from the funny little trick you played on us by putting Earl Vincent's and L. Ron Hubbard's names on the back (or would you call it the edge?) to the odd little short that ran off with most of the honors: "Helen O'Loey."

And, too, was your *Nova* story an exceptional one. Another old writer who has made a terrific comeback.

I've always maintained that when Ed Hamilton turns out a good, fairly readable story, it is a memorable occasion. And the December issue definitely wasn't one of those times. Like Schachner—although the latter individual is a bit closer to the top in this category—Hamilton is what I would call a *hack* writer. The less stuff I see of those two writers, the better I like it.

"The Merman" comes tearing in at third place this month, with hardly anyone following close. Casey and Schere have both yet to equal their first stories in Astounding. However, this month I believe that M. Schere made the poorest showing of the two.

Schachner's epic was another stupendous chaotic revelation in words. I wonder if he has tried his hand at writing cross-word puzzles yet?

To sum the issue up, briefly, I think it slightly above the average. The three previous men-

tioned hits tide over any failing the others may have had. The cover was neat, and the new type very satisfactory. Get something like it for the interior, instead of the woody stuff you're using now. Wesso cops the interior illustrations, but I still think that Schneeman is your best. His spacships always are excellent. And let's have a Dold cover now. You've tried most of the others.

'Til next time then, *bon soir*—Russel A. Leadabrand, Box 264 A, Route 2, Dinuba, California.

Fans: For the Analytical Laboratory, what three stories, in order rate best of the year?

Dear Mr. Campbell:

Although I have been reading Astounding for a great many years (about three) this is the first letter that I will not consign to my wastepaper basket.

First, I want to say that the smooth paper that I came across a few issues ago, I'd like to see again, if not for the whole issue, just for the feature story.

Since the year is over I might as well say that:

Best short stories were:
March 1. The Master Shall Not Die! (Please continue it.)

" 2. Flight of the Dawn Star.

July 3. The Dangerous Dimension.

Aug. 4. The Terrible Sense.

May 5. Island of the Individualists.

Most amusing:

Nov. 1. The Einstein Inshoot.

" 2. Anachronistic Optics.

Best long stories:

Apr. 1. Iszt—Earthman.

Sept. 2. X-I-200.

" 3. The Trapper.

July 4. Rule 18.

Oct. 5. Other Tracks.

Aug. 6. Jason Comes Home.

Jan. 7. Ormoly Of Roonerion.

June 8. Men Against The Stars.

Dec. 9. A Matter Of Form.

Dares anyone dispute my choice?

Before I quit, I'd like to say that I dislike the back of the new cover; not the drawing by Schneeman, who did as good a job as he did for the "Legion Of Time," which same are the best of the year—Seymour Liff, 823 E. 46th St., Brooklyn, N. Y.

You'll find Hubbard in the April UNKNOWN with a fantasy up to the standard Russel sets in the March issue. Vincent's "The Morons" is coming—delayed by the changes.

Dear J. C.:

Notice the cheery, intimate greeting. Gives the letter that cozy, we-two-alone-by-the-blazing-hearth touch, don't you think? Now, if I slip a knife into your back during the next few minutes, you'll know it's all in a spirit of friendly banter.

Really, though, if a blackjack should slip into this little pillow fight, I mean it in the friendliest way. I read your first issue way back yonder and hope I'll live to read your last number. I don't suppose I will, though, because I'm twenty-three now and can't hope to last much past ninety.

In your brand-new December issue there is so much to notice that one is a bit bewildered. The cover looks like an improvement. We have the outstanding magazine of its class here, and there is nothing like an open mind for improvements to keep it in first place. The natural thing is to remember the "good old days," but

we can't let sentiment stop progress. What was good about them anyway? I have read at intervals about the heroes of the old, pre-Street & Smith Astounding. I've especially heard a lot about Hawk Carse, so would like to scuttle his spacship right now, in case some of the newer readers should think they missed something. Just call him "Two-gun," and put him on a horse—and any back Western magazine will give them all of that kind of reading anyone can stand.

We have advanced so far that there is no pleasure in reading the old type story, so let's forget about them and look to the future.

Before we get too far from the new cover, would like to know why you had the names Harl Vincent and L. Ron Hubbard on the back panel. That is the only place in the book they are mentioned.

I wish you would make up your mind when you are going to give us our monthly pleasure. A few months ago you released a bulletin that you would hit the stands the second Wednesday of the month. Now, some one must have mentioned that in a letter, but I've seen no trace of a clue. Now the magazine is coming out on the fourth Friday. Let us in on the details, please. We all feel as though we had a part interest.

Why don't you have Don A. Stuart write some more stories, Mr. Campbell? "Who Goes There?" is tops for the year as far as I'm concerned.

I didn't like either of the serials in the December issue. They just didn't click with me, but there were probably plenty who liked them. I don't say they were bad stories, just that I, personally, didn't like them. After all, who am I to criticize? I couldn't do as well, so I won't heckle the authors. (Some of your other readers would do well to remember that.)

You have done a fine job so far, and I'm sure you can continue to improve. There is no real limit to our type of literature. The human imagination is so constructed that each forward step only brings a new horizon into sight—J. J. D., 221 W. James St., Dwight, Ill.

**And Simak's got a woman this time!
Anyway, 1000 years ought to be old enough!**

Dear Mr. Campbell,

Having barely survived the bludgeonings of Miss Byers in the December issue, I return undaunted to the fray.

First, I wish to point out that she herself considers the "sex theme" as unadulterated "hokum." She tries to get out of it, though, by bringing in the idea of "feminine interest" and saying that it's not women in themselves, but the way they are handled that causes the whole trouble.

Very well, granted! Women are pretty handy creatures! (What would we do without them, sniff, sniff?) But, how in tarnation are you going to enforce a rule that the "feminine interest" must be introduced in an inoffensive manner?

There are certain authors (very few) that can handle women with the greatest of ease. The great Weinbaum simply permeated his stories with women and yet I never read a story of his that I didn't enjoy (may his soul rest in peace). E. E. Smith's women are swell, and I find I get along with them. Jack Williamson is pretty good, even when he brings in his goddesses. However, that about exhausts the list.

The rest of the authors, while all very good in their way, can't bring the "feminine interest" into a story without getting sloppy. There is an occasional good one ("Helen O'Lox" is a beautiful case in point) but for every exceptional one there are 5,739 terrible cases. Stories in which the love interest drowns out everything, in which

"swooning damsels" are thrown at us willy-nilly.

Notice, too, that many top-notch, grade-A, wonderful, marvelous, etc., etc., authors get along swell without any women, at all. John W. Campbell, Jr., himself, is the most perfect case of all. Nat Schachner has very few indeed. Clifford D. Simak has none. Ross Rocklynne has none. The list can be extended much further.

The point is whether we can make every author a Smith and Weinbaum or whether we cannot. What do you think? Therefore, let Smith and Williamson keep their women, but for Heaven's sake, let the rest forget about them, partly anyway. I still say we're after science-fiction.

Of course, we could have women-scientists. Madame Curie is immortal, so are many others. Unfortunately, instead of having a properly aged, resourceful, and scientific woman as a savant, what do we have? When there is a woman-scientist (which is very rare in fiction, believe me) she is about eighteen and very beautiful and oh, so helpless in the face of danger (gr-r-r).

Which is another complaint I have against women. They're always getting into trouble and having to be rescued. It's very boring indeed for us men. I should think the women themselves (proud creatures) would be the first to object.

In the third paragraph, Miss Byers wants to know whether I think girl-fans are interested in the adventures of an "almost-ridiculous hero." Oh, don't I? How about Robert Taylor and Clark Gable? I'll bet all the females swoon just reading their names in Brass Tacks. Besides, if they don't go for heroes, what are they doing reading science-fiction? Let them go back to love stories (which are written by women for women) and they'll find even slap-happier heroes there.

Furthermore, Miss Byers is very ill-advised in her attempt to bring up the greater influence of women as against men in the course of history. Let me point out that women never affected the world directly. They always grabbed hold of some poor, innocent man, worked their insidious wiles on him (poor unsophisticated, unsuspecting person that he was) and then affected history through him. Cleopatra, for instance. It was Mark Antony that did the real affecting; Cleopatra, herself, affected only Mark Antony. Same with Pompadour, Catherine de Medici, Theodora and practically all other famous women of history.

But I'll quit now before I create a national vendetta against myself on the part of all female science-fictioners in the United States. (There must be at least twenty of them.)

This answer may be taken as a defense of Donald Turnbull's courageous stand against the ace menace to science-fiction as well as a defense of my own stand. I say this, because Donald may not find time to answer, and I have promised to defend him against attack with all the power of my good right arm—Isaac Asimov, 174 Windsor Place, Brooklyn, N. Y.

With Astounding and UNKNOWN, Ye Ed. runs a race with the famous paperhanger. Hence he can't write.

Dear Mr. Campbell:

Here is my first letter to Astounding since you took over the editor's chair—in fact, it is my first letter to Astounding. Period. It is a pleasure to read a magazine edited by the author of that top-notch trilogy (I vote them the best Science-Fiction ever): "The Black Star Passes," "Invaders From The Infinite," and "Island Of Space." Any man who can write like that—and much more like it—is by me Hokay. I have read the three major science-fiction publications since their inception, having

complete files of them all, so my vote ought to carry some weight.

But to more immediate matters: I have just read the December issue, and rate it equal with the best. The new cover lettering looks better to me every time I see it. The present style of lettering is more in keeping with the contents: original. Schneeman's first attempt at cover-drawing also looks better at every glance. The subdued blues contrast well with the brighter colors in the lower left corner. The subject smacks of science without going into the weird or utterly preposterous. But should not the clothes of a man under water appear a little soggy?

To Leslie A. Crouch: You are wrong about the "Mutant" quality of "Sunworlds Of Soldus." Suggest you read Williamson's "Island in the Sun" in the September and October, 1935, issues of Astounding.

As for the stories in the December issue: "Simultaneous Worlds" is Schachner's usual exciting, though somewhat far-fetched brand. The idea, I think, is new. I suppose that, if Tom Jones of America eats too much lobster with ice cream and pickles, then Tojos of Amrique is suddenly seized with an inexplicable misery in the midriff. "Nuisance Value" starts off well with its variation No. 14432zz on Standard Plot No. 3Q: "How to unconquer a previously conquered Earth." Poor Terra! How oft hast thou been conquered, reconquered, unconquered in the name of science-fiction?

The idea of transplanting brains is far from new, but "A Matter Of Form" puts an entirely new light upon it. For Hamilton and his Ephemerae: "Phooey." The ending kills this one. That our hero, when all else has failed, should suddenly see walking toward him a normal female of the species to help perpetuate the race, is too much of a coincidence even for science-fiction. And a lovely lassie, at that, a sweet young thing, the only person in the world to have heeded the scientist's warning, still sweet and lovely after hiking three thousand miles across the country, toting a rifle. Hamilton has done far better. He could have worked in a believable ending here, too, and made this story a top-notch.

"Helen O'Loy" the walking, talking, cooking, loving robot struck me as a bit of drivel. As for "The Merman," I can just say that I liked it. Ditto with "Let Cymbals Ring," though there seemed just a little too much threatening of contempt of court. To my mind the most enjoyable course of the whole meal was "They Had Rhythm," another medal on Casey's chest. That cheery little bit of nonsense left me feeling as at the end of a perfect dinner; pleased and comfortable. My rating of the stories, considering the index in the magazine to have been numbered, is: 6, 3, 7, 1, 8, 5, 4, 2.

One feature I like about Astounding is that the actual date of issue is not weeks, and even months, ahead of the date of the magazine.

Give us something as original as "Who Goes There?" That story is one of the few that does not involve a super-invention to handle the invariable menace. All science-fiction stories, it seems, must have a menace. Also, something by yourself, if possible. Just because you are the editor, do not let that fact deprive the readers of the author of "The Mightiest Machine" and numerous other tales of tremendous scope, which you and Dr. Smith, alone, write so well.

About illustrations: The reasons for the popularity of Wesso and Dold lies in their uniqueness. Each has a style peculiar to himself alone, and his average illustration can be recognized without looking at the signature. Dold creates a mood of the fantastic; Wesso, of the everyday done up in Cellophane. Brown and Marchioni also have individual styles, and are competent illustrators, and the four of them, to my mind, constitute the ideal illustrating staff. Dold to do the bizarre, Wesso to do the machines and people, Brown to do the fantastic, and Marchioni to do the "alien planet" scenes. All four to alternate on the covers. As for Paul: He reached his prime in 1929, his

machines and spaceships were peerless, though his humans were terrible in their high-pated uniformity. He has steadily declined, particularly since the advent of the small-sized magazines. By the way, does Wesso (formerly, I understand, Wessolowski) think that all people have wavy hair?—Charles Johnson, 3301 Highland Ave., Drexel Hill, Pa.

**Because Campbell is now twice as busy!
And—to the defense!— N_2O_5 is an exothermic compound that catalysts could form, though all other nitrogen oxides are not.**

Dear Sir:

Subject No. 1:

I would like to start a movement among the readers of all the science-fiction magazines to have the writings of E. E. Smith, including the "Skylark" stories and "Galactic Patrol," and the writings of Campbell, including "The Mightiest Machine" published in book form—how printed, whether bound in paper or leather, I do not care. To achieve this end, how about a flood of letters from those fans who may be interested?

No. 2:

How come Campbell, busy with editing though he may be, does not find time to write us another story?

No. 3:

Who will start "shivering lances" as in the good old days? Now this game of swacking sabers and shivering lances was a good one. A writer, plunging into the unknown with all the momentum of his imagination, would set up a system of postulates on which to base his "science-that-might-be true. Thenceforth he would violate neither those postulates nor the "science that we now know." If his foot slipped, if he said something that "could not be" according to known science, or according to those postulates that he always implied (but seldom stated) the gang would jump on him. Thereupon, as he rose in wrath to his defense, lances shivered and casques were rent.

This combat is always based upon true science-fiction, never on mere fantasy.

For instance, Campbell, long ago, in "The Mightiest Machine," if my memory does not double-cross me, tells of a catalyst by which the nitrogen and oxygen of the air are caused by some naughty person, to unite, forming nitrous oxide and even nitric acid. Some reader challenges him, stating that a catalyst can influence reaction rate tremendously, but never after the equilibrium composition of the reaction products, for that, seize, would violate the most inviolable of the laws of Thermodynamics. How many chemists, working on catalysis, pulled the same boner in the progress report they wrote last Tuesday? Or rather, turned in Tuesday morning. But the above situation is one of those that used to cause jousting in the lists.


No. 4:

I would like to receive a letter from any person, male or female, age under thirty, who can solve the following problem, whose solution requires calculus plus, I may say, ingenuity.

Professor Eldee has found that the emanations of radium have a certain effect upon a certain gas. So he fills a spherical container with the gas, puts a speck of radium in the center, touches the stop-watch, and notes results. Next he mixes his "certain gas" with a radioactive gas, such as Niton, and repeats.

Now he has a sphere filled with uniformly distributed—we assume—radioactive molecules, from which particles depart uniformly in all directions and proceed in a straight line until they strike the walls of the container, which we assume will simply absorb them.

In terms of the radius of the sphere, what is the average length of the paths of all these emanated particles, assuming the distribution of the radioactive molecules to be uniform? Is it R , $R/3$, or $2/3R$, and can you prove it? No flappers need try, for the solution might be difficult.—Glenn R. Stephens, Box 1181, Thermopolis, Wyoming.



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Scarlet Letter.....	35.00
Venus and Adonis.....	5,000.00
Leaves of Grass.....	250.00
Snow-Bound.....	45.00
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Last of the Mohicans.....	50.00
Moby Dick.....	100.00
Little Women.....	25.00
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Tamerlane & Other Poems.....	5,000.00

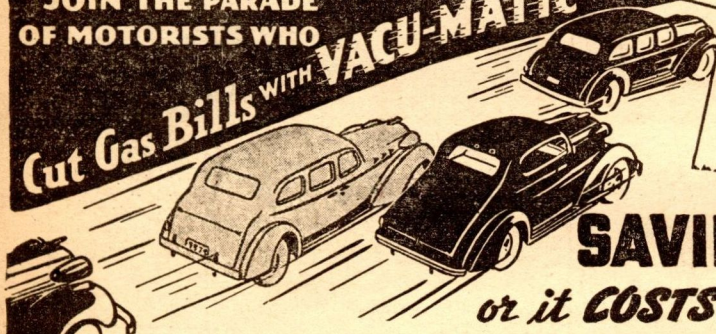
These are but a few of the many thousands of books we want. DON'T SEND BOOKS until you have checked our latest list giving full information. Don't delay—a single old school book, story book, bible, poetry, history, travel, almanacs, newspapers, letters, etc., may bring you \$25, \$50, \$100, \$500 or even \$5,000 cash for certain books. Better investigate NOW. Send 10c to the American Book Mart, 140 S. Dearborn St., Dept. 377, Chicago, and we will send you latest list of old books we want to buy and cash prices we will pay.

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Notary Public

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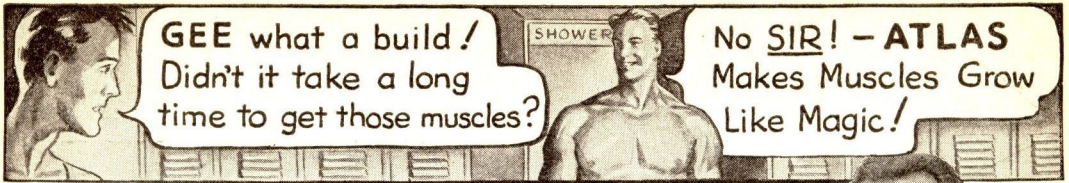
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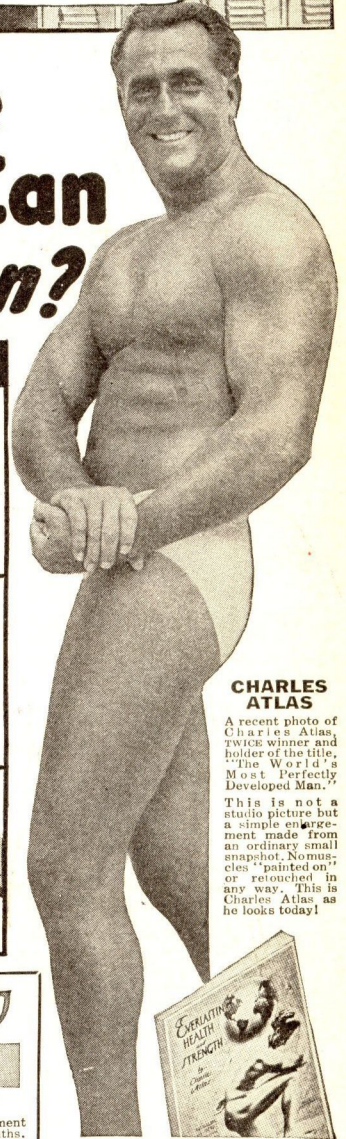
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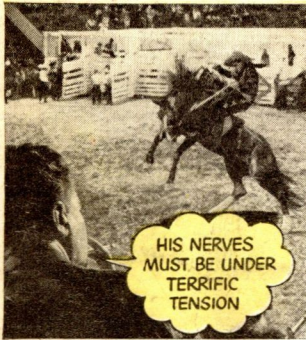
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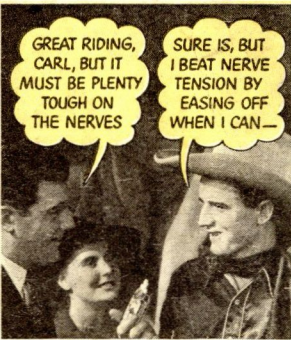
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"You bet Stunt Riding is a strain on the Nerves!"

says Carl Dossey, CHAMPIONSHIP COWBOY AND RODEO STAR

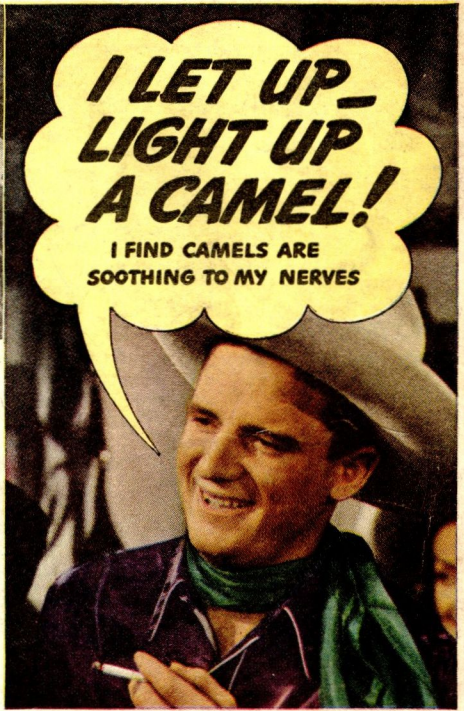


HIS NERVES MUST BE UNDER TERRIFIC TENSION



GREAT RIDING, CARL, BUT IT MUST BE PLENTY TOUGH ON THE NERVES

SURE IS, BUT I BEAT NERVE TENSION BY EASING OFF WHEN I CAN—



**I LET UP—
LIGHT UP
A CAMEL!**
I FIND CAMELS ARE SOOTHING TO MY NERVES

"RIDE 'EM, COWBOY!" ... and Arizona's Carl Dossey *does*—with the brilliant rodeo horsemanship that's won him two bareback championships in California, and a high-point cowboy title at the big Cedar City (Utah) show. He's pictured above in a breath-taking stunt at New York's Madison Square Garden. No room in *this* performance for tense, jittery nerves! Later, over a Camel, Carl explains his way of sidestepping nerve strain ... a pleasant way you'll want to adopt.

MUCH CAN BE LEARNED ABOUT NERVES BY OBSERVING THE DOG



NO DOUBT about the nerve strain in Dossey's life. But often we don't realize how tense nerves can get in every-day occupations—perhaps in your own. Miss Ferril (*below*) avoids nerve strain as so many smokers do ... by letting up—lighting up a Camel!

THE English Springer Spaniel (*above*) is speedy, agile—an especially good gun dog. He has a highly developed nervous system remarkably similar to our own ... sensitive, high-keyed. But, unlike many humans, this dog doesn't ABUSE his nerves. When a dog feels tired, he rests **INSTINCTIVELY!** We often let will-power whip us on, deaf to the warning that nerves are getting frayed. Yet how much more pleasant life can be when nerves are rested now and then. Pause frequently ... **LET UP—LIGHT UP A CAMEL!** You'll welcome Camel's mildness—rich, ripe flavor. Smokers find Camel's **COSTLIER** tobaccos are soothing to the nerves.



"ACCURACY IS VITAL in my job," says Elsie Ferril, who works all day at an adding machine. "My work requires intense concentration. I can't afford jittery nerves. So, when I feel nerve tension coming on, I let up—light up a Camel. I find this a pleasant way to soothe my nerves."



Smokers find Camel's Costlier Tobaccos are SOOTHING TO THE NERVES

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