ECLIPSES OF THE SUN By SIR ARTHUR S. EDDINGTON

THRILLING WONDER STORIES

15¢

APR.

HOLLYWOOD ON THE MOON
A Novelette of Tomorrow's Movies
By HENRY KUTTNER

•

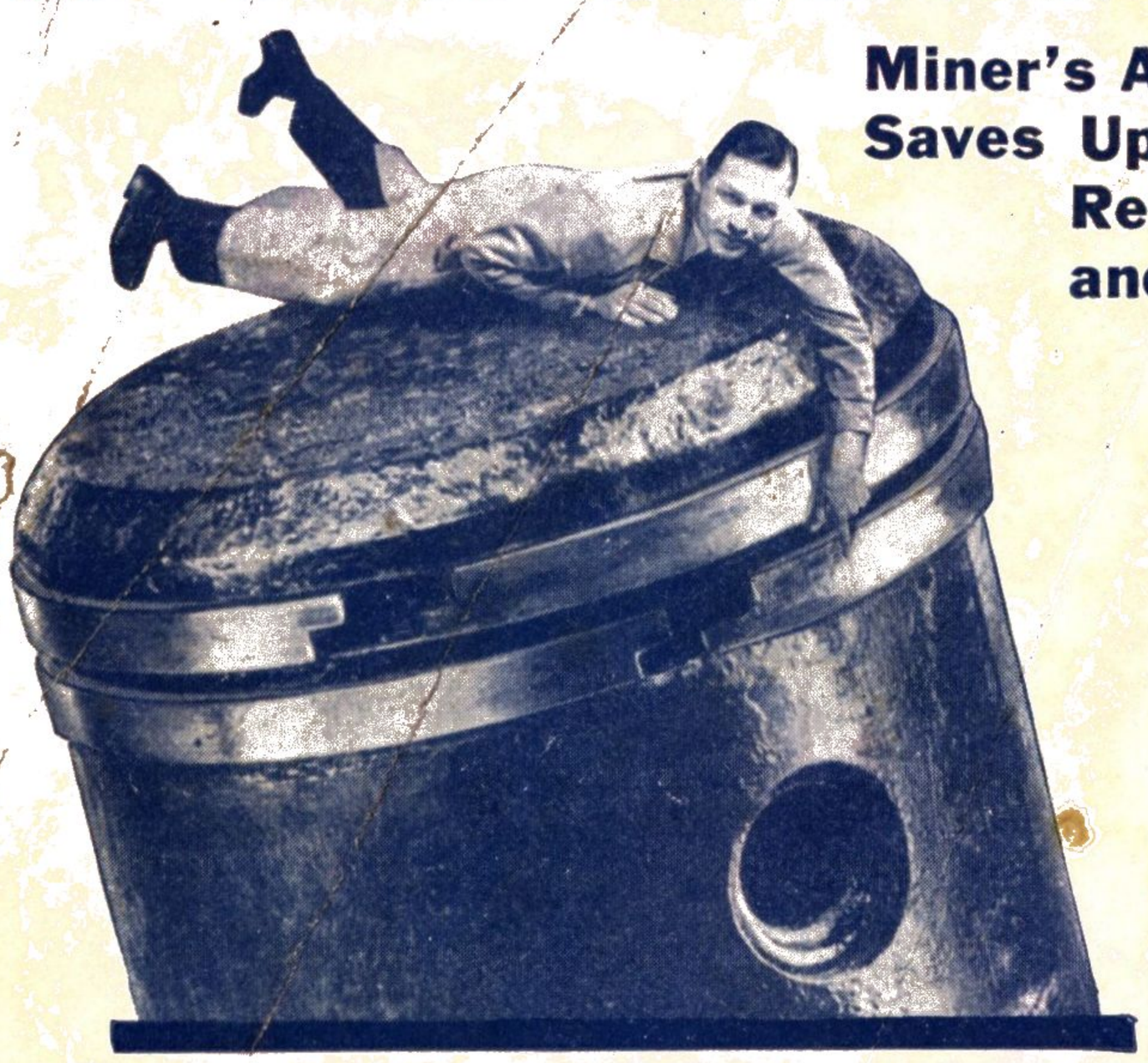
THE DARK AGE
A Future Science Tale
By CLARK ASHTON SMITH

•

THE INFINITE ENEMY
A Novelette of A Lost Universe
By JACK WILLIAMSON

A THRILLING PUBLICATION

DON'T BUY RINGS *or* REBORE IF CAR WASTES OIL *and* GAS



Miner's Amazing Mineral Discovery Saves Up to 95% of New Ring and Rebore Costs. If Worn Rings and Cylinders Are Wasting Oil and Gas Send Coupon Below for FREE SAMPLE!

SAVES OIL SAVES GAS

Nearly a half-million motorists have used this revolutionary method of cutting oil and gas waste caused by worn rings and cylinders. Savings up to 50% reported. Give your car new power, pep, speed and quiet with this amazing mineral discovered in the Rocky Mountains. Awarded A.T.L. Seal of Approval.

TAKES PLACE OF NEW RINGS AND REBORE!

Quickly placed through spark plug openings and at a fraction of the cost of new rings and rebore, this amazing mineral fills in and plates worn rings and cylinder walls. Ovrhaul gives your motor increased compression. Cuts oil consumption, increases gas mileage, adds new power and speed, with other substantial benefits of new rings and rebore. Ovrhaul has been thoroughly tested and proved by impartial laboratories and great Universities in the United States and abroad. Proved harmless to finest motors.

Why Pay Up to $151.37 for New Rings and Reboring?

If worn rings and cylinders cause your car to be an oil and gas eater—before you spend a lot of money, try Ovrhaul. Give it an opportunity to do for you what it has done for thousands of others. Here are costs of new rings and rebore on a few 1935 models: Chevrolet $50:00; DeSoto, $62.50; Dodge, $59.20; Ford, $50.00 to $55.00; Cadillac, $151.37; Packard, $112.50.

ENDORSED
By Member of
Society Automotive Engineers National Aeronautical Assn., Detroit Soc. of Engineering, Pontiac Engineers Club.

Let us send you L. H. Smith's complete report which shows that the compression of a badly worn 6-cylinder motor was increased 32.4% and brought back to within .09 points of its original new car efficiency. Such tests conclusively prove the sensational merits of Ovrhaul.

INSTALLED IN 30 MINUTES!

Ovrhaul works on the mineral plating principle—No special tools needed. No car tie-up. No danger of ruining motor by grinding cylinder walls—works in while you drive, saves you time and money. Gives you months of extra car use. A single application lasts up to 10,000 miles.

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For Salesmen and Distributors Who Act Quick!

Sales of Ovrhaul have been phenomenal. Hundreds of Salesmen and Distributors in the United States and abroad. The biggest money-maker in years. National magazine, newspaper and radio advertisers carry the message of Ovrhaul to over 18,000,000 car owners. The market has barely been scratched. To wide-awake men we offer opportunity—an opportunity which may never come your way again. A fast selling, repeating article, fully protected by U. S. and foreign patents. Saves motorists millions of dollars. Exclusive territories still open—but you must act quick if you want to get in on this.

SAMPLE FREE!

If your car is wasting oil and gas, before you spend up to $150.00 for new rings and rebore—send your name and address on the coupon below for a free sample of this amazing mineral which expands up to 30 times when heated, and full details of a real money-making opportunity. **Air mail reaches us overnight from the East.**

Free SAMPLE COUPON

B. L. Mellinger, Pres. (*Paste on Postcard and mail*)
Ovrhaul Co., C-912, Los Angeles, Calif.

Without cost or obligation, rush me FREE SAMPLE. Also show me your big money-making plan.

Name .....

Address.....

City..... State.....

PHONE, WRITE OR WIRE TODAY!

Let us send you free sample which every salesman is furnished for demonstration. Let us show you, with their permission, ACTUAL earnings of our distributors. Let us show you how you can start in this business NOW—before all territories are assigned. The market is there—we have the product—are you the man? Let's find out. Write, phone or wire today.—**B. L. Mellinger, Pres.,**

OVRHAUL CO.,
C-912, Los Angeles, Calif.

"You don't have to TELL IT TO THE MARINES they KNOW!"

...WRITES HARRY E. REECE, FROM THE U. S. VETERANS HOSPITAL AT MEMPHIS, TENN.

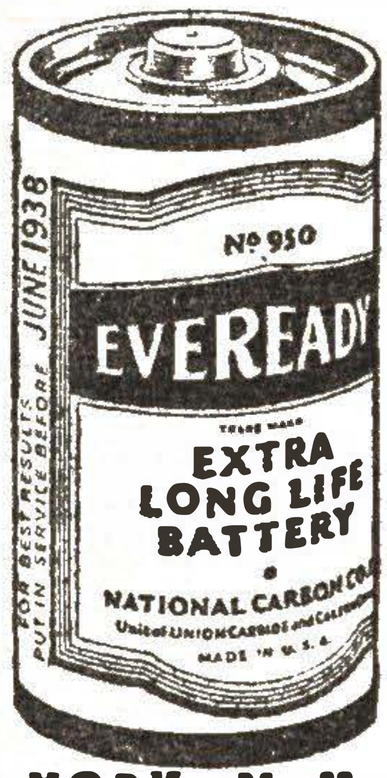
"On active duty with the Fifth Marines in the Nicaraguan jungles, I went to our field hospital with fever. One day a badly injured Marine was flown in...it was my buddy!

"His head had been bashed in by a machete. To save him, surgeons must remove fragments of skull pressing on the brain... a delicate operation anywhere, it was extra tough in a field hospital. I guess they didn't have much hope. Just when they started operating...

"Our small portable generator had failed! Hospital corps men rushed through the dark ward, gathered up flashlights some of the men had there, and with the light from *fresh* DATED 'Eveready' batteries, the surgeon finished his work.

"My buddy returned to duty, is still living and he thanks one *swell* Marine Corps surgeon and *dependable,* dated 'Eveready' batteries. They were the only kind our canteen sold, the only kind that could have taken what we gave 'em.

(*Signed*) Harry E. Reece"



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THRILLING WONDER STORIES

The Magazine of Prophetic Fiction

VOL. 11 NO. 2

April, 1938

IN THE NEXT ISSUE

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THE DUAL WORLD
An Interplanetary Novelette
By
ARTHUR K. BARNES

•

MURDER IN THE VOID
A Novelette of Space-Ship Mystery
By
EDMOND HAMILTON

•

TERROR IN UTOPIA
A Novelette of Super-Science
By
PAUL ERNST

•

CONQUEST OF THE DEEP
A Special Article
By
WILLY LEY

•

—Plus many other unusual novelettes, stories and features.

● EVERY STORY BRAND-NEW

Table of Contents

● COMPLETE NOVELETTES

● THRILLING SHORT STORIES

● SPECIAL ARTICLE

● SPECIAL FEATURES

● OTHER DEPARTMENTS AND FEATURES

● ON THE COVER

This cover painting depicts a scene in Henry Kuttner's interplanetary novelette, HOLLYWOOD ON THE MOON.

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Names of all characters used in stories and semi-fiction articles are fictitious. If a name of any living person or existing institution is used, it is a coincidence.

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Do you want to make more money? Broadcasting stations employ engineers, operators, station managers and pay up to $5,000 a year. Spare time Radio set servicing pays as much as $200 to $500 a year—full time servicing jobs pay as much as $30, $50, $75 a week. Many Radio Experts own their own full or part time Radio businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to $6,000 a year. Radio operators on ships get good pay and see the world. Automobile, police, aviation, commercial Radio, loud speaker systems offer good opportunities now and for the future. Television promises many good jobs soon. Men I trained have good jobs in these branches of Radio.

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Almost every neighborhood needs a good spare time serviceman. The day you enroll I start sending Extra Money Job Sheets showing how to do Radio repair jobs. Throughout your training I send plans and ideas that made good spare time money for hundreds. I send Special Equipment to conduct experiments, build circuits, get practical experience. I GIVE YOU A COMPLETE, MODERN, PROFESSIONAL ALL WAVE, A L PURPOSE RADIO SET SERVICING INSTRUMENT TO HELP SERVICE SETS QUICKER—SAVE TIME, MAKE MORE MONEY.

Find Out What Radio Offers You

Mail the coupon now for "Rich Rewards in Radio." It's free to any fellow over 16 years old. It points out Radio's spare time and full time opportunities, also those coming in Television; tells about my Training in Radio and Television; shows you letters from men I trained, telling what they are doing, earning; shows my Money Back Agreement. MAIL COUPON in an envelope, or paste on a post card—NOW.

J. E. SMITH, President, Dept. 8D09
National Radio Institute, Washington, D. C.

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National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligating me, send "Rich Rewards in Radio," which points out the spare time and full time opportunities in Radio and explains your 50-50 method of training men at home in spare time to become Radio Experts. (Please write Plainly.)

NAME.....AGE.....

ADDRESS.....

CITY.....STATE.....

The Story Behind the Story

"CAMERA! . . . ACTION!" Those were the starting signals for every film epic made in the old days—not necessarily the good old days—when movie directors wore riding boots, carried megaphones and turned their peaked caps backward to keep their necks from developing Kleig eyes. Directors have changed since then, fortunately, and so have pictures, but "camera" and "action" are still synonymous, and no film is worth its salt that fails to keep its screen vibrantly alive.

And so it will be in the future. Technicians of a modern era will establish de-luxe cinema presentations with marvelous three-dimensional effects. Present strides in film perfection indicate that the movies of the future will be as real and vivid as the legitimate theatre itself. But whatever the next generation offers for filmland, it is safe to say that "Camera" and "Action" will always b backbone-requisites.

TOMORROW'S MOVIES

HOLLYWOOD ON THE MOON, the feature novelette in this month's issue, centers on a theme never before utilized in science fiction—the production of movies in the future. How will directors and engineers of the next age photograph interplanetary pictures? How will they bring to the screen the various biological monstrosities roaming the nine different planets?

HENRY KUTTNER, popular fantasy writer, gives you the answer to these fascinating questions and many more in his glamorous story, HOLLYWOOD ON THE MOON. You'll meet Anthony Quade in this story, ace camera expert for Nine Planets Films, Inc. And if you'll like this, there'll be another Tony Quade novelette waiting for you in an early issue of T.W.S. With plenty of camera and action. But let's change the scene for a moment and let the scenarist, Mr. Kuttner, reel off the highlights of his story's genesis:

HOLLYWOOD ON THE MOON had its genesis during a conversation with one of the editors of T.W.S., and was developed over a restaurant table with the aid of Arthur K. Barnes, who joined the party. I believe things started to happen when I said that I might write a mystery yarn set in Hollywood, and the editor observed, "Why not a science fiction yarn about the movies?"

That was all that was necessary. Maybe the idea wasn't good, but it was more than a little fascinating. We collected Barnes, and together we pieced out the story. It was a very easy yarn to write, as it was planned in complete detail beforehand. Hollywood has been treated little, I think, In science fiction—and incredible things happen out here on the West Coast. Obviously practically impossible things could happen in Hollywood on the Moon.

I tried to follow logic and known scientific fact in the story. A motion picture colony of the future might well develop along these lines. Human character is the only constant in science fiction, and it is on that I attempted to build the tale.

The science? Well, robots animated by wires and machinery have been used in such films as **King Kong** and **The Lost World.** Radio-controlled robot beasts would be ideal for filming adventure-pictures of other worlds. As for the Bouncer, the only completely fantastic part of him is his ability to read thoughts. More than one creature can imitate the human voice, and it is known that many animals possess a wider range of vision than mankind.

Nor is the red leech impossible, when you consider the various parasites which use other creatures as hosts. The Hyclops, obviously, is the victim of a misplaced mother-instinct. Third-dimensional cameras are in common use; the revolving doub e shutter gives the necessary stereopticon effect. The onlooker really sees two pictures projected viewing one with each eye.

I emphatically agree with Eando Binder that characterization is the backbone of a good science fiction yarn, and I tried, therefore, to make my characters as lifelike as I could. Whether or not I have to some extent succeeded is not for me to judge, but for the readers.

THE INVERSE UNIVERSE

INTERPLANETARY stories come and go. By far, they're our favorite variety of theme. But when an author takes time out to embellish his offering with an approach that's strikingly different—well, we call the result a corker.

We hope we're not wrong in acclaiming THE INFINITE ENEMY a superior story. JACK WILLIAMSON, its author, has written many hundreds of thousands of words of science fiction. This one, we think, ranks high up on his "tops" list. His letter explaining the basis for his novelette, incidentally, is as interesting as the story itself. Here goes:

The story behind THE INFINITE ENEMY has several possible beginnings. It might begin with a letter I wrote Edmond Hamilton, about 1930. It might begin with the startling mathematical discoveries made by a man named Dirac, at about the same time. Or with the faint shining track that Anderson, in Chicago, observed, a year or so later, in a Wilson cloud chamber. Or, for that matter, it might even begin with the fact that a science fiction writer suddenly wanted money to buy a new microscope.

To begin with the letter, Hamilton's reply led to a close friendship, and the friendship to a projected collaboration. A story by two writers, we agreed, ought to be twice as good as one by either. So we set out to plan a world-beater. It was an odyssey of inter-universal adventure, to be called ROVERS OF INFINITY.

The project, I suppose, was a little too ambitious. And collaboration is, we discovered, a difficult art. We abandoned the story. Left in my files was a description of the infinite entity, which I had planned to use in one of my episodes of the **opus magnus.** Hami ton claimed no interest in it, and somehow it stuck in my mind, too interesting to be forgotten.

My files contain hundreds of story ideas, in various stages of progress. Often a promising idea is turned over and developed a bit, every now and then for several years, before the yarn becomes real and complete enough to be actually written. The old unconscious, I think, does part of the work.

At last, anyhow, I had a story of adventure

(Continued on Page 125)

Why Trained Accountants Command High Salaries

—and how ambitious men are qualifying by the La Salle Problem Method

GET this straight.

By "accountancy" we do not mean "bookkeeping." For accountancy begins where bookkeeping leaves off.

The skilled accountant takes the figures handed him by the bookkeeper, and *analyzes* and *interprets* them.

He knows how much the costs in the various departments should amount to, how they may be lowered.

He knows what profits should be expected from a given enterprise, how they may be increased.

He knows, in a given business, what per cent of one's working capital can safely be tied up in merchandise on hand, what per cent is safe and adequate for sales promotion. And these, by the way, are but two of *scores* of percentage-figures wherewith he points the way to successful operation.

He knows the intricacies of government taxation.

He knows how to *survey* the transactions of a business over a given period; how to show in cold, hard figures the progress it has made and where it is going. He knows how to *use* these findings as a basis for constructive policies.

In short, the trained accountant is the *controlling engineer* of business—one man business cannot do without.

Small wonder that he commands a salary two to ten times as great as that of the bookkeeper. Indeed, as an independent operator (head of his own accounting firm) he may earn as much as the president of the big and influential bank in his community, or the operating manager of a great railroad.

Some Examples

Small wonder that accountancy offers the trained man such fine opportunities—opportunities wel illustrated by the success of thousands of LaSalle accountancy students.* For example—one man was a plumber, 32 years old, with only an eleventh grade education. He became auditor for a large bank with an income 325 per cent larger.

Another was a drug clerk at $30 a week. Now he heads his own very successful accounting firm with an income many times as large.

A woman bookkeeper—buried in details of a small job—is now auditor of an apartment hotel, and her salary mounted in proportion to her work.

A credit manager—earning $200 a month—moved up quickly to $3000, to $5000, and then to a highly profitable accounting business of his own which netted better than $10,000 a year.

And What It Means to You

Why let the other fellow walk away with the better job, when right in your own home you may equip yourself for a splendid future in this profitable profession?

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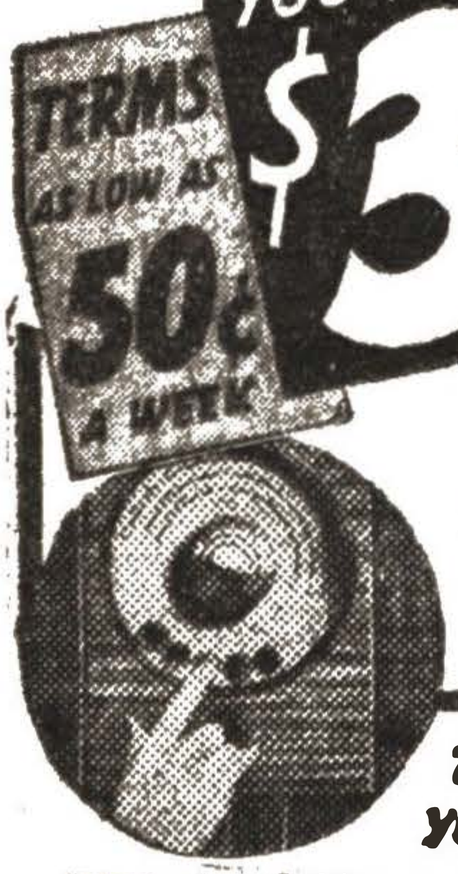

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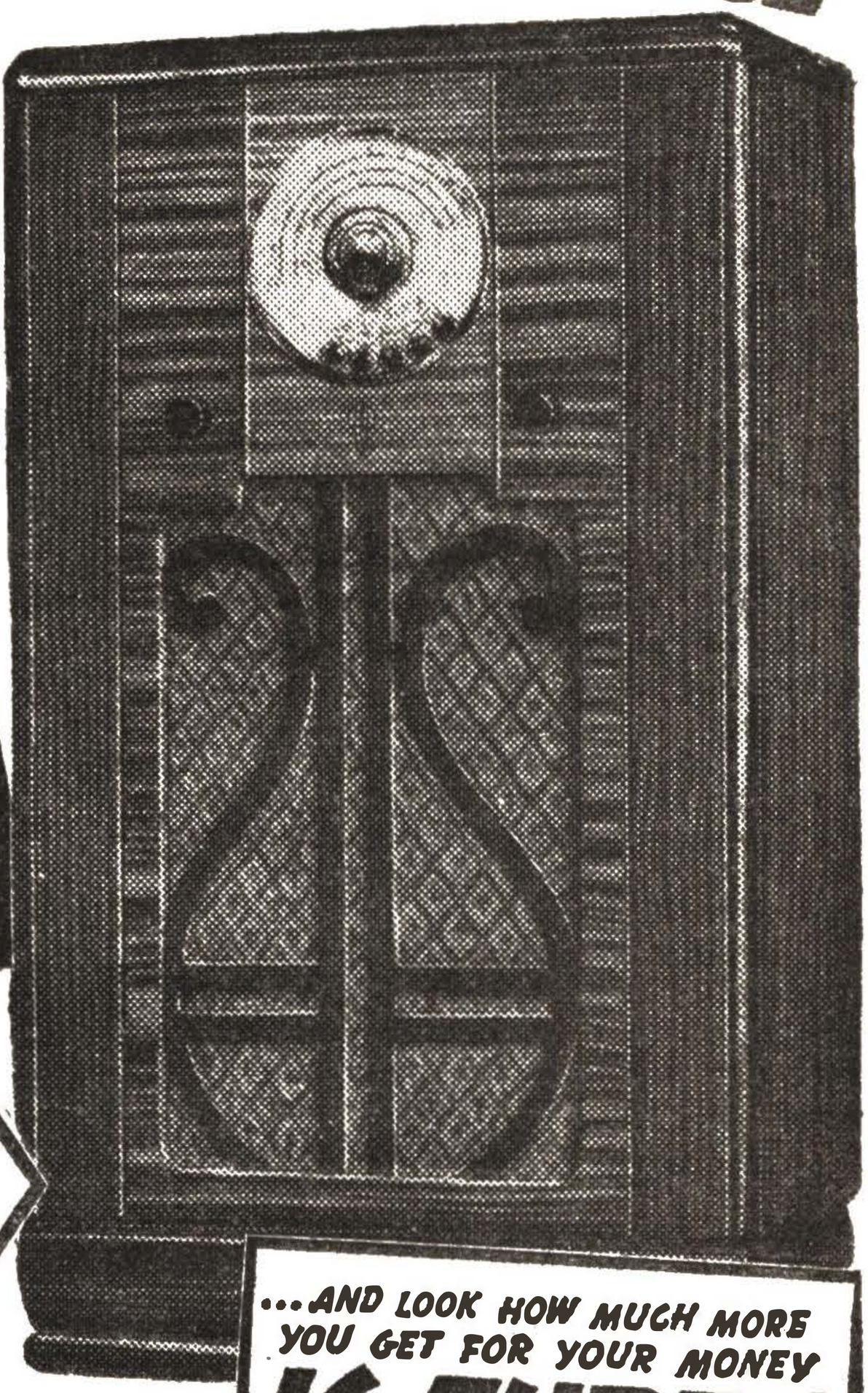

TOUCH A BUTTON—ZIP... YOUR STATION FLASHES IN!

LET us send this marvelous new 1938 Midwest 16-tube radio to your home . . . on 30 days FREE trial. Use it for four weeks *before* you make up your mind! If you decide to keep it, you secure $30.00 credit on your old radio . . . and Midwest will call for it at your home!

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...AND LOOK HOW MUCH MORE YOU GET FOR YOUR MONEY

16 TUBES
WORLD-WIDE RECEPTION

★ *16 tubes for price of 8—*
★ *Not a cut-price set, but a bigger, more powerful, super performing COMPLETE radio in a big exquisitely designed console of matched Walnut—*
★ *Faster Dial-A-Matic Tuning—*

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Send me your new FREE catalog, complete details of your liberal 30-day FREE trial offer, and factory-to-you wholesale prices.
(Special offer and prices prevail only when dealing direct with factory by mail.)

Name ..... (PLEASE PRINT CLEARLY)
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Town ..... State .....
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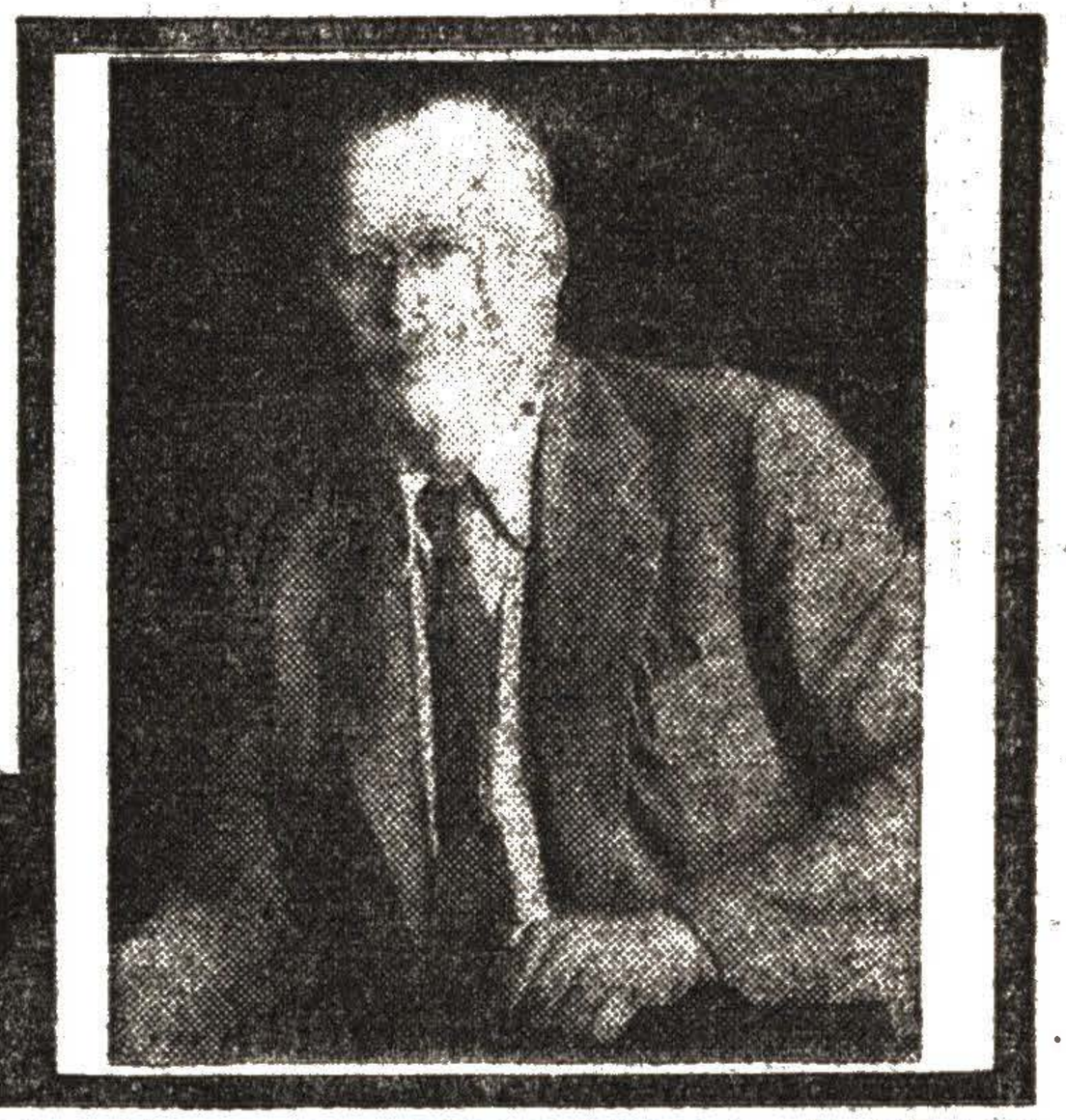
An UNCOMMON BUSINESS for MEN ★

WHO ASPIRE ABOVE WAGES OF $30 TO $40 A WEEK

★ No amount is too much for a business man to spend if he has a clear-cut profit ahead. This fact is behind the phenomenal surge of a most singular business which is rapidly becoming the talk of many sections of the country.



$10,805.00 EARNED in NINE MONTHS SELLING to BUSINESS MEN

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200% PROFIT AND UP

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$151 HIS SECOND WEEK

$58.35 CLEAR ONE DAY'S WORK

$1000 IN A MONTH . .

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Send full particulars your proposition without obligation to me.

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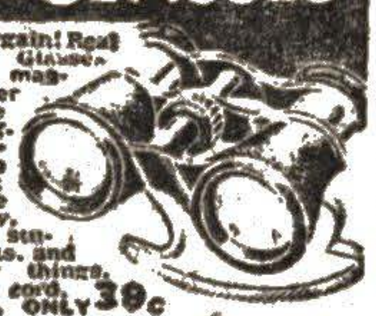
INVISIBLE INK. CAN BE READ ONLY BY THOSE WHO KNOW THE SECRET. USED BY SPIES, ETC. COMPLETE DIRECTIONS. 10c BOTTLE.

FIELD GLASSES



WOW! What a bargain! Real genuine Field Glasses with six power magnification. Center piece quick, one finger focussing. Permits full, unhampered, two eyed vision that gives remarkable scope and clarity. Swell for nature study, hiking, sports, and a million other things. Complete with cord, packed in box. ONLY 39c

Pocket Telescope

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Six Power
25c

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World Mike

Made especially for home use, attached in a jiffy without tools. Not a toy. Put on your own programs at home, parties, club affairs, etc. Barrels of fun! Easy to operate.

Price Postpaid 25c

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Large, substantial, all-metal mike. Practise radio singing, broadcasting, programs, etc., thru your own radio. Reproduces voice in loud, clear tone without distortion. Regular table model—can be held in hand. Guaranteed. Connected with 75c out tools. Price

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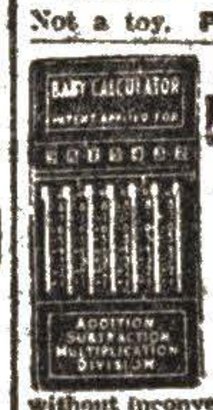

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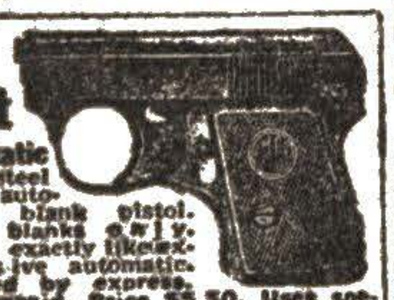

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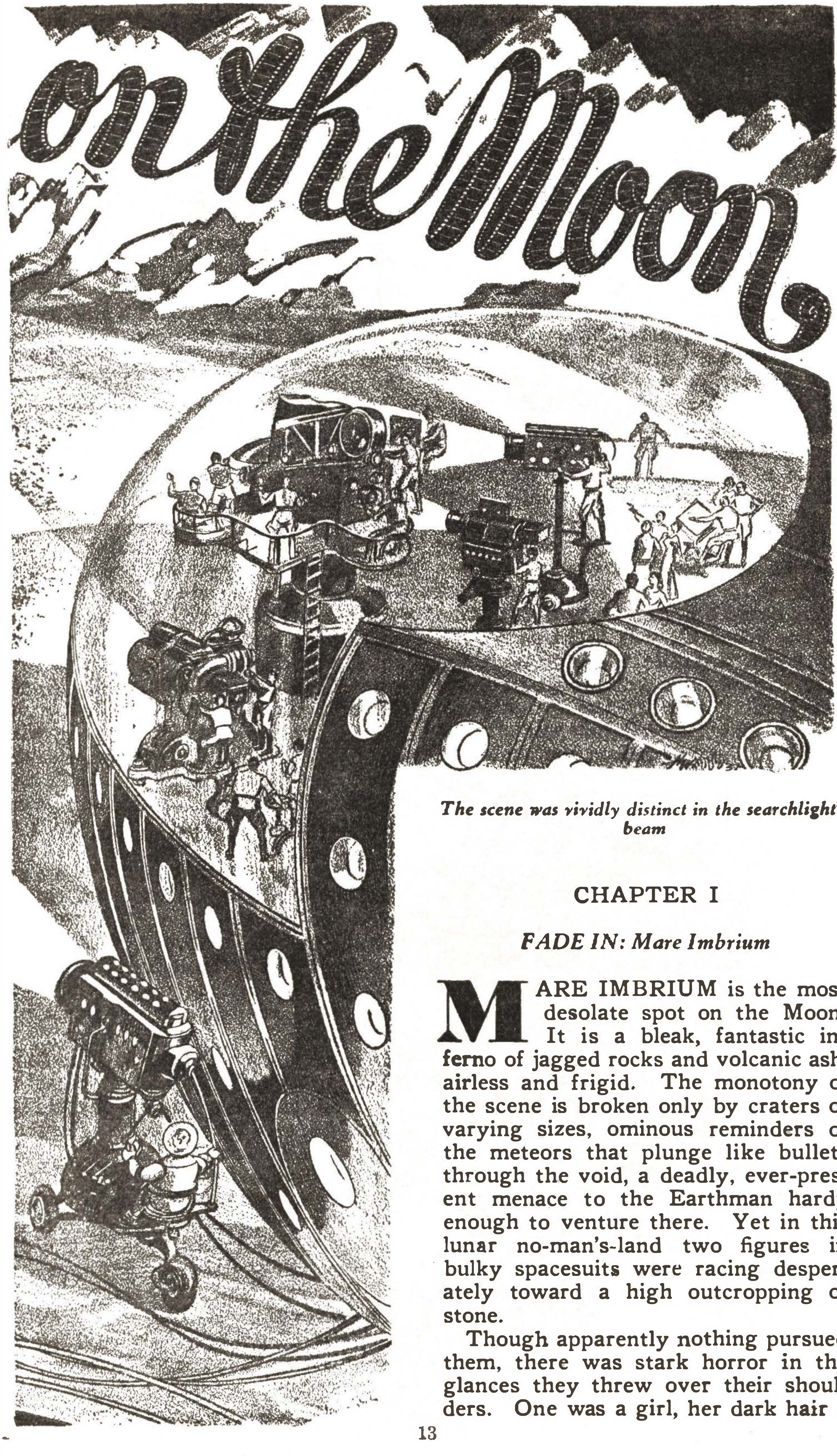
Long streamers of light fingered out

Drive Along Lunar Boulevard and Dine at the Silver Space-suit with Tony Quade, Camera Expert for Nine Planets Films, Inc., at the Movie Capital of the Future!

By HENRY KUTTNER

Author of "When the Earth Lived," "Four Frightful Men," etc.

Men of the Moon



The scene was vividly distinct in the searchlight's beam

CHAPTER I

FADE IN: Mare Imbrium

MARE IMBRIUM is the most desolate spot on the Moon. It is a bleak, fantastic inferno of jagged rocks and volcanic ash, airless and frigid. The monotony of the scene is broken only by craters of varying sizes, ominous reminders of the meteors that plunge like bullets through the void, a deadly, ever-present menace to the Earthman hardy enough to venture there. Yet in this lunar no-man's-land two figures in bulky spacesuits were racing desperately toward a high outcropping of stone.

Though apparently nothing pursued them, there was stark horror in the glances they threw over their shoulders. One was a girl, her dark hair a

cloudy mass within the transparent helmet. The other was a man whose face was curiously expressionless, and whose movements, somehow, failed to match the animation of the girl's. Yet when she stumbled and fell he paused and helped her to her feet. About to resume her flight, the girl's mouth gaped in an open square of terror. She flung up a pointing glove.

The shining thing had sprung into existence without warning. Its brilliance eclipsed the dim globe of the Earth, low on the horizon, and the white splendor of the stars. It seemed to be a gigantic shell of flame, spinning madly in a blaze of glaring colors, the poles of its axis elongated into two thin cords of light that trailed into nothingness. It hesitated, hovering, then dipped as though in mocking salute. It swept down toward the two.

From its flaming core streamers of light flared out, and abruptly the man in the spacesuit was lifted as though by giant, invisible hands. Writhing and twisting, he was pulled closer to the shining thing. The girl made a frantic clutch at her belt and drew a slender tube, but before she could use it the inexplicable power had dragged her feet clear of the ground. She hung for a moment motionless.

From above a beam of light fingered out, but the girl did not glance up. She was staring, horror-stricken, at her companion.

His eyes were distended hideously. All over his spacesuit a dim, lambent radiance seemed to play. Then, abruptly, fire spouted from the neckband of his suit. A flower of flame blossomed where his helmet had been. Instinct with a weird and terrible beauty, it flamed up into a tapering spire—elongated and stretched, until a lambent thread stretched out toward the spinning thing of light.

And from every joint in the spacesuit—wrists and feet and waist—streamers blazed out, gleaming tracceries that united and reached out avid fingers toward the whirling blaze.

From the tube in the girl's gloved hand a thin, bluish beam sprang. But already her suit was glowing ominously as she was drawn inexorably closer. Her face was drained of blood, contorted in an agony of fear . . .

"HO, hum," said Anthony Quade sleepily. "Take it over, Peters. The chief's buzzing me."

Tony Quade, turning from a camera in the transparent nose of the space ship, cast a last glance at the scene below, vividly distinct in the searchlight's beam. Valyne Ross was a good stunt girl. There wasn't a star on the payroll of Nine Planets Films, Inc., who would risk her skin on this side of the Moon, but the job had to be done, and Quade knew Valyne would do it. Quade had a trick of knowing such things. That was why, when Nine Planets wanted special effects that entailed plenty of risk, they hired Quade for the job.

And *Space Bandit* needed Quade. It was the biggest picture on Nine Planets' schedule this year, and they had already expended a fantastic sum on its production. Van Zorn, the chief, would get it back, of course, provided Quade did his job well. *Space Bandit* would be big box-office on its special effects—and Tony Quade, with his picked band of film experts, was the only man who was able enough and courageous enough to tackle the assignment. On a contingent basis at that.

Gaunt, hollow-cheeked Peters slipped into Quade's seat before the telephoto-lensed camera, and began to manipulate the keyboard, occasionally pausing to peer through a finder. On other levels various members of the crew were busy operating lights and cameras.

Tony Quade went through a door, stooping slightly to avoid bumping his head, and arranged his large, big-boned body in a chair before the televisor. For a second he contemplatively eyed the peroxided blonde who was gazing out at him and murmuring, "Mr. Quade, plee-uz . . . Mr. Quade, plee-uz!" He flipped over a switch.

Immediately a gigantic eye appeared on the screen and a hoarse voice was heard growling curses.

"Hello, Chief," Quade said tentatively. Apparently Von Zorn was in a bad humor.

The eye withdrew and gave place to

a small, simian face with a tooth-brush mustache and a crop of bristling, wiry hair. Snapping black eyes regarded Quade menacingly.

"The deadline on your special effects for *Space Bandit* is November ninth. You haven't by any chance forgotten that, Quade?" Von Zorn inquired with feigned politeness.

"Oh, for Pete's sake," Quade said, relieved. "I'll have the stuff for you by then. There's plenty of time. You're not worrying already, are you?"

"You'll be the one to do the worrying," Von Zorn observed. "Unless you turn in a satisfactory film, you don't get paid. I don't give a hoot in Mercury about that. But unfortunately we've advertised *Space Bandit* so big that unless you deliver the goods, it won't draw flies."

"Okay." Quade nodded. "I'm shooting the last of the Mare Imbrium sequence now, and it's coming along fine. The work on Eros will be finished pretty soon, and we can blow a hole in that asteroid big enough to give you a super-colossal spectacle."

"Gregg did your calculations, didn't he? Well, he made a big mistake somewhere. You can't use Eros!"

QUADE'S eyes changed. He leaned forward.

"What the devil! I've rented the asteroid for a month—my claim's perfectly good. There's no intelligent life there above the eighth level. In fact, there's no life at—"

"I know," Von Zorn said unpleasantly. "I've read the law. All matter in the Solar System is the property of the Earth Government, and can be rented or purchased from it, unless already inhabited by life above the eighth level of intelligence—which is about that of Gregg. Lord knows how it happened. He should have checked and double-checked his figures."

Quade restrained himself with an effort.

"Would you mind telling me just why I can't use Eros?" he inquired.

"Because it's heading into an ether eddy. And you know what that means. Extinction. Blotto. Your polar city isn't half built, and it'll take ten days to complete it. And the ether eddy will reach Eros' orbit in a week."

"Thanks for telling me," Quade said, and shut off the televisor. He sat silent, regarding his large, capable hands. He had built up a fortune with them, and now, at one stroke, he was losing it. For he had staked almost everything he owned on this enterprise.

Quade looked up as Peters came in. "The shooting's done, Tony," the gaunt man said. "We're taking Valyne and the robot aboard now. It looks pretty good."

"Okay," Quade grunted. "No more shots today. Tell the pilot to head for Hollywood on the Moon. *Muy pronto!*"

Frowning, Quade went into the ship's transparent nose. He stood there silent, watching the silvery-gray surface of Mare Imbrium race past below. As the ship's speed increased the Apennines became visible towering against the sky-speckled sky to the north, but the gigantic range was soon left behind. They fled over the crater of Herodotus and sped on, while the Earth sank lower and lower and at last dropped beneath the horizon.

The Moon is egg-shaped. The larger part is turned perpetually toward the Earth, but the smaller end is scooped out into a vast crater, whence volcanic activity in some long past eon had blown a fragment as large as the asteroid Vesta. Within this great hollow is an atmosphere, life, great buildings and studios—Hollywood on the Moon!

A little thrill shook Quade as the ship sped over the Great Rim and he saw beneath him the film capital. He could never become quite used to this tremendous city, rising from an arid and inhospitable world. And, because films were the breath of life to Quade, he felt oddly cold at the thought of going broke and dropping out of the life of the picture metropolis. For in Hollywood on the Moon there is no place for the weakling. It is run through a combination of power, graft, and efficiency, but there is no room for incompetents.

The city of terraces and towers and

wide streets was the most healthful in the Solar System because of the artificial atmosphere, germ-free and automatically purified, kept on the Moon by an electro-magnetic gravity field created by gigantic machines in the caverns beneath the surface.

The air-blanket shields Hollywood on the Moon from the blazing rays of the Sun, protects it from the chill of frigid space, aided by huge plates that broadcast radiant heat. It is the dream of every girl's life to drive along Lunar Boulevard and dance at the Silver Spacesuit. A dream one girl in a hundred thousand ever realizes.

Quade called Peters. The gaunt-faced camera expert came into the ship's nose, scratching a gray-stubbled cheek. He cast a quick glance down at the sunlit city.

"NICE to be back, but — there's trouble, Tony, isn't there? What's happened?"

Swiftly Quade told him. Peters whistled.

"Well, what can we do?"

"Use Ganymede."

"Jupiter's moon? It's too far."

"No, you sap, the asteroid Ganymede. It'll be at perihelion in a few days, and that'll bring it within the orbit of Mars, close enough for us. We can't use Eros, because after the ether eddy hits it there won't be any Eros. But we'll put up a set at Ganymede's pole and film the explosion there. It'll be a rush job, but we can make it before the deadline."

"What about property rights?" Peters asked.

"I want you to attend to that. I'm going to get my own cruiser refueled and head for Ganymede to look things over. You rent Ganymere for a month, and—yeah, better get an option, too. If we kick it out of its orbit, we can just take up the option and we'll be safe—it'll be our own property then. Order the Eros crew over to Ganymede right away, and tell 'em to get started building the set. You finish the Mare Imbrium scenes, and then follow. We'll need all the help we can get."

"Oke," Peters assented, as the ship grounded with a jar. "Where are you off to now?"

"I," said Quade grimly, "am going to find Gregg."

Gregg was at the Silver Spacesuit, his round, fat face ludicrously disconsolate beneath his glistening bald dome. When he saw Quade he looked as though he was going to cry.

"Oh, don't take it so hard," Quade growled, sliding into a cushioned chair at Gregg's side. "I'm not going to fire you, though you know darn well you deserve it. What happened?"

"It was my fault, Tony," Gregg said in a choked voice. "You don't know how sorry I am. I know what it means to you. I've been nearly crazy for the last few weeks."

"Eh?" Quade stared, and then glanced up as a waitress glided up in her tiny gilded autocar. "I'm not hungry, thanks. Oh—wait a minute. Yes, I am. I've got a long ride ahead. Double order ham and eggs."

The girl looked shocked, and made a feeble attempt to suggest Moontruffle salad instead, but Quade waved her away and turned back to Gregg.

"Now what the devil is this all about?"

"It's my daughter," Gregg said, scrubbing at his plump cheeks. "I know it's nothing to you, but it's the reason I made such an awful mistake and overlooked that other eddy. I've been worrying about my daughter, been half crazy. She's movie-struck, Tony—you know."

Quade nodded. "What'd she do? Stowaway on a Moon ship?"

Gregg nodded miserably.

"Her mother wrote me that she'd left a note and was coming to Hollywood on the Moon to get in pictures. You know what that means!"

Yes, Quade knew. He'd never approved of the law that the film magnates had had passed through pulling political strings. Yet he could understand their attitude. In the early days the glamour of Hollywood on the Moon had called girls from all over the world —Europe, Asia, America, Australia— and a veritable flood of eager applicants had poured in, smothering the Moon city until regular work had been impossible.

IN ancient times, when Hollywood had been a tiny town on the shore of the Pacific Ocean, it had been easy for disappointed would-be stars to return home or find jobs.

But the Moon is 239,000 miles away from the Earth, and it had cost the studios a fortune when in desperation they had herded the movie-struck girls together and shipped them back home.

They couldn't be allowed to stay. There wasn't room. And now the penalty for Moon-stowaways was a fine of fifteen thousand dollars, or fifteen years' imprisonment.

"I haven't got the money, of course," Gregg said. "And, worse, I can't find Kathleen. She's afraid of the police, I'll bet, and hasn't dared get in touch with me. Or something may have happened to her."

"For Pete's sake," Quade said. "Why didn't you tell me this weeks ago? I'd have paid the fine, and you could have sent the kid back home with a good spanking."

"You were on location. I didn't have a chance. Besides, I couldn't let you pay, Tony."

"Rats! I'll—uh—I guess I can't pay anyway, Gregg! I've got all my dough tied up in this job, and if it flops—I won't have a split penny." Quade's face fell. "No use trying to pull any wires, either. I'm *persona non grata* on the Moon unless I bring back the bacon."

"And it's my fault. Blast it, Tony, I feel like jumping off the Rim."

"Shut up," Quade said affectionately. "You lop-eared idiot! Everybody makes mistakes, and you couldn't help it anyway. I'm heading for Ganymade, and we'll have everything sewed up in a week. If you find your kid, keep her under cover until I get back."

"Okay," Gregg said, getting up. "That's why I came here. I thought she might have a job as waitress, somehow. But I guess not. Well—good luck."

Quade grinned reassuringly at him and attacked his ham and eggs. Presently the lights were dimmed, and a crimson spot outlined the shimmering, silver-clad figure of a girl who hung apparently suspended in empty air in the center of the dining room. Warm, throbbing music pulsed out, and the girl's throaty, languorous voice began to sing:

Give me a ship to roam the lone star-ways,
Out around Venus I'll follow the far ways,
But my heart will turn home . . .

"Hello, sap!"

Quade looked up. It was Sandra Steele. He grimaced and returned to his meal.

SANDRA STEELE was the ultimate product of Hollywood on the Moon.

Her skin was a lifeless white, almost luminous, and her eyes, originally brown, had been tattooed a startling shade of violet. Her hair was a silvery web that floated, unbound, about her shoulders.

"On your way, pig," Quade grunted. "I don't want your autograph."

No screen star likes to be called a pig—a synonym for chorus girl. Sandra's blue-nailed, slender fingers twitched visibly, but she restrained herself.

"You filthy little swine," she observed softly. "Just watch how fast I'll break you now I'm in with Von Zorn. I've had enough of your impudence."

Quade drank some water and blinked sleepily. However, he knew Sandra was a dangerous enemy. If it hadn't meant losing all self-respect, he'd have made a different answer when she had first invited him to become what amounted to her gigolo. He had said no, and told her a few unpleasant truths, hoping they'd be good for her soul.

Now she was playing up to Von Zorn, the chief—and that meant power.

"Listen, Tony," she said, bending to look directly into his eyes. "Why not be nice? Von Zorn's mad as a hornet about this Eros trouble, but I can take care of him. How about it?"

"Go chase a meteor," Quade said, and left her.

CHAPTER II

CUT TO: Space Cruiser

QUADE hailed a taxi and was hurtled along Lunar Boulevard to the spaceport, where his ship waited, refueled and ready. It was a two-man cruiser, with the usual transparent nose of camera-ships, speedy and powerful. Nodding to the mechanic, Quade glanced at the setting sun and climbed aboard. Quade entered the forward compartment and touched the siren that warned aircraft a spaceship was taking off. He set the gravity plates and went back into the rear room.

A man was asleep in the hammock, with Quade's best fur robe pulled over him. Quade gasped a startled oath and fled back to the instrument board to reverse the gravity. The ship, which had been lifting, settled.

With hasty strides Quade returned to his passenger and planted the toe of his boot firmly where he thought it would do the most good. The next moment he was staggering back with his ears buzzing and the imprint of a hand red on his tanned cheek.

"Jupiter!" he exclaimed incredulously. "A girl! For Pete's sake—you can't be Gregg's kid!"

The girl looked something like an indignant rabbit, with a furry white helmet drawn tightly about her oval face, a stubborn little chin and snapping brown eyes. She bounced out of the hammock and Quade retreated hastily.

A buzzing drone came from the other compartment. With a bewildered look on his face Quade stepped back into the nose of the ship and met the gaze of Von Zorn.

"Oh, Lord," he moaned to himself. "What have I done to deserve this?" But he shut the door quickly behind him and smiled in what he hoped was a disarming fashion.

At close range Von Zorn more than ever resembled an ape. He knew it, and was enormously sensitive about his appearance. Only a week ago he had fired an ace director who had made some wisecrack about the chief's simian appearance.

"What are you grinning about?" he asked, eying Quade with distaste. "How about my picture?"

"*Space Bandit?*" Quade put his back against the door. "Simple. I'm switching the locations to Ganymede. Going there now, in fact. My Eros crew has already landed, I guess."

Von Zorn took out a cigar, made from the aromatic, greenish tobacco grown on the Moon, and cut it carefully. "I've trouble enough without you making it worse," he growled. "Our last Venusian picture is flopping, and we invested over a million in it. That blasted Carlyle woman's blown it sky-high."

"Gerry Carlyle?"

"Yeah. The catch-'em-alive dame. We pay out half a million to the biological labs to create duplicates of Venusian animals, and now there aren't any audiences because Gerry Carlyle's brought back the real thing."* .He lapsed into a stream of fluent profanity. "I had another picture ready for you, Quade—a super-special, *The Star Parade*—but it doesn't look as if you'll get the assignment. Sandra Steel's featured in it, and she won't work with you."

"That's nice of her," Quade said, gently edging Von Zorn toward the door and hoping the girl would keep quiet. "I'll see you later, Chief. I've got to hurry."

VON ZORN became reflective. "You know, I've half a mind to go with you," he said. He paused, and Quade stopped breathing. "But I've got a date with Sandra tonight. So you'll have to get along without me."

"That'll be tough," Quade responded hoarsely, and shut the door behind the chief. He was at the instrument board

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* Creating artificial life-forms on the Moon is more practical than buying the bona fide article, which would necessitate a prohibitive overhead in duplicating and maintaining the creature's natural habitat. A Venusian "whip," for example, would require several miles of jungle in which to browse, as well as several hundred pounds of fresh meat weekly.

Nor does the local lunar government fail to consider the possibility of epidemic caused by some malignant bacteria using the body of an imported animal as host. The artificial beasts have the added advantage of being obedient to radio control, a vital factor in picture making.

in a single leap, and sent the spaceship rocketing up almost before Von Zorn had had time to get clear. Quickly he set the course.

"Where the devil are you taking me?" an angry voice asked behind him. Quade got up slowly, mopping his forehead.

"Listen," he said very gently, "I've been through a lot today. You may not know it, but you've caused enough trouble to throw Jupiter out of its orbit. And unless you're careful, young lady, you're going to get the spanking I told your father you deserved."

She had pulled off her white helmet, but still wore a close-fitting worker's uniform of brown leather. Her chin went up.

"I don't care if my father does work for you. You can't talk to me that way, mister. I came here because I thought you'd help me out, the way Dad's cracked you up in his letters—but I guess he was wrong. So just take me back to the spaceport."

Quade grinned maliciously. "You're not going to have your own way this time," he told her. "In fact, I think you're going to get more than you bargained for. Our first stop is Ganymede!"

Several hours later Quade said didactically, "Ganymede is a small asteroid which has an atmosphere because its mass is so great. It's very heavy. Understand?"

Kathleen nodded. She was sitting at Quade's feet, looking out through the ship's nose at the blazing vastness of interplanetary space.

"I didn't think it was big enough to have any air. Is it breathable, Tony?"

"Sure. There isn't quite enough oxygen, though, so it isn't very comfortable. But it's tremendously heavy for such a tiny world. We'll land there pretty soon."

The televisor buzzed shrilly. Quade reached out a long leg and clicked over the switch. On the screen a man's face sprang out in sharp detail.

He had good-looking, bony features with shaggy eyebrows and a jutting jaw, under a harsh mouth like a steel trap.

"Tony?" he said sharply. "There's trouble! We left Eros when we got your message. We've been on Ganymede four hours now, and the work's been started. But a herd of Hyclops cleaned out the camp!"

Quade sucked in his breath.

"Yeah? What happened?"

"They drove the crew away, the ones they didn't kidnap. I'm in the ship, and they can't get at me, but I can't handle it alone. Ghiorso just wigwagged a message from outside. The Hyclops are chasing him, and he says he'll go south along the Bore. Are you armed?"

"Sure. But I'd better come right to the camp, Perrin."

"The Hyclops will kill Ghiorso and the others if you do. Better do as he says, Tony, and head this way afterward. Huh?"

Quade hesitated. "All right. Hold on, kid. I'll be along."

HE snapped off the televisor and let his fingers dance over the keyboard. The ship leaped forward at an acceleration that would have killed the occupants if it had not been for the neutralizing gravity field.

"Can I help?" the girl asked.

"Yeah. Keep quiet . . . sorry. Wait until we hit Ganymede. Then you can help, all right."

Far ahead, spinning like a tiny ball through space, the asteroid came into view. Stretching across the face of the globe was a thin black line—the Bore, a broad channel that held practically all the water on Ganymede. Gripped by the mass of the asteroid, it nevertheless moved in a tremendous tide along the Bore whenever Ganymede came close to another body whose gravitation had appreciable influence.

It was some time before they reached the Bore, and cruised swiftly northward, keeping a sharp watch for refugees. Kathleen first saw the man. He was staggering along the rocky bank, tripping occasionally on the grayish moss; and Quade grounded the ship almost beside him.

The refugee stumbled to his knees, clawing at the ground. Quade flung open the door and sprang out, Kathleen beside him. He lifted the other.

"Perrin!"

The steel-trap mouth of the televisor operator gaped.

"Yeah—they got in the ship. I had to run for it. Get Ghiorso, Tony."

"Sure." Quade lifted the other easily and turned to the cruiser, but Perrin struggled feebly. "He's just—up the Bore a little ways. Behind that rock. Couldn't come any further."

Gently, Quade put Perrin down.

"Wait here," he said to the girl, and sprinted along the Bore. The rock was some distance away, and he found himself breathing heavily in the alien atmosphere, with its deficiency of oxygen. He reached the boulder—and saw that there was no one behind it.

Then he heard Kathleen's cry.

He swung about. Despite the mass of Ganymede, the gravity was less than terrestrial, and he made a great bound that brought him almost above the asteroid's close-lying air blanket. He held his breath, feeling an icy chill strike him. Looking down he saw Perrin and the girl struggling. Kathleen went down, clutching at the man's legs, but he kicked free viciously, leaped within the space ship. The door thudded shut.

Quade sprinted the rest of the way, though he knew he'd be too late. The space cruiser lifted and drove up, and in a moment was lost beyond the sharp curve of the horizon. He stopped beside Kathleen. She was rubbing a bruise on her forehead.

"No," she said, answering Quade's question, "Not hurt a bit, except my head. But I couldn't stop him. He just hit me, and started to get in the ship."

"Swell," Quade grunted. "What the devil is that rat up to? I wonder." He shrugged and turned to stare northward. "Well, unless we want to stay here and starve, we'd better head for the pole. It can't be far. Can you walk?"

"Sure," she said, eying him. "You're a cold-blooded person, aren't you? Haven't you any idea why he stole our ship?"

"My ship, you mean," Quade corrected pointedly. "No. But I can probably find out at camp, so let's get started. You'll slow me down enough as it is."

KATHLEEN compressed her lips on some retort, and fell in behind Quade as he started along the bank of the Bore. There was no water in the channel; it was probably on the other side of the planetoid, drawn by the gravitational influence of Mars. The landscape was bleak and barren; rocks, and a rubbery, grayish kind of moss. The curve of the horizon was startling.

Quade turned to the girl suddenly.

"See that?" he asked, pointing.

Something was bounding toward them in a series of short leaps. At first a scarcely visible dot, it grew rapidly in size until it plopped down directly in front of them and stood staring. It was about a foot and a half high.

Quade, watching Kathleen's face, chuckled. "Never seen anything like that before, have you?" he asked.

She shook her head wondering.

"What is it, Tony?"

"I don't know the Latin name, but—you noticed the way it travels? It's vulgarly known as a Bouncer. Stanhope called 'em that when he first landed on Ganymede, and the name's stuck. But there isn't much known about them, as this asteroid's rather an outpost. Nothing to bring people here."

The Bouncer eyed the two curiously. It had a turnip-shaped head, with two huge, staring eyes, between which a button of a snout was set, and down beneath a fantastically long upper lip was a puckered, sad-looking mouth. Underneath a fuzzy growth of soft white hair its flesh was pink.

Its body was shaped like that of a kangaroo, save that it had no tail; and possession of a round, bulging paunch made it resemble a grotesque little gnome. The short forearms and paws were curiously anthropoid in contour.

"Notice its eyes," Quade said. "It's got a unique range of vision. Sees the infra-red and ultra-violet rays. There's another funny thing about it, too. Listen."

The puckered mouth opened. The Bouncer nodded its turnip-shaped head a few times, and suddenly announced, "Your face is dirty, Kate."

Kathleen made a soft little scream

and started violently, while Quade roared with laughter. The Bouncer jiggled up and down, nodding as though pleased with itself, and observed, "It talked. It actually talked."

"You're not hearing things," Quade chuckled. "I told you Bouncers are funny animals. Besides seeing ultra-violet and infra-red light, they can read thoughts!"

Kathleen swallowed with an effort. "Really, Tony? I—I still don't believe it."

"Why not? Our thoughts are a combination of words and images, and Bouncers can pick up strong vibrations broadcast by a brain. Try it. Think something—hard."

Kathleen looked at him questioningly, and then glanced down at the Bouncer, who nodded and worked his puckered mouth swiftly. She squared her shoulders and her chin came up.

"Only a mannerless tramp would criticize a lady's personal appearance," the Bouncer declared. "I guess that's telling him. Oh, for heaven's sake, how do I turn it off? I can't stop—"

THE small voice died into silence as Quade grinned.

"See? It picks up strong thought-impulses—and that's probably why it never became popular as a pet. Too dangerous. I don't believe more than a couple were ever exported from Ganymede."

Kathleen dropped to her knees beside the little animal, and it pawed the air violently with its tiny hands. She scratched the pointed head gently. It jiggled with delight and said, "Her hair's awfully pretty. If she weren't such a spoiled kid—"

"Come on!" Quade said very loudly, and hastily started up the bank, his face flaming. Smiling maliciously, Kathleen followed, and after a brief hesitation, the Bouncer made the party a trio. The girl quickly struck up a firm friendship with the agile little creature, and after asking Quade for an opinion which he refused to give, decided to call him Bill.

"For Bill's no worse than any other name," she told the Bouncer, to which he replied, "Especially if Tony doesn't like it." After that Bill became silent, while both Kathleen and Quade tried desperately to suppress the strength of their thoughts.

The scenery changed little as they advanced. It was a tumbled wilderness of rocks, the eternal soft gray moss, and the dry Bore at their right. At last, without warning, they found Ghiorso.

Quade should have guessed what was wrong. Certainly the man's body didn't look normal, with its bloated torso and withered, shrunken limbs, as it lay crumpled on the moss, a skull-face turned up blindly to the purple sky. As it was, he paused a dozen feet from the corpse and gripped Kathleen's arm. "Wait a minute," he murmured. "I'm trying to remember something. I think—"

Bill made his mistake, one that was almost fatal. Bounding about the two like an India-rubber ball, he caught sight of Ghiorso's body and immediately hopped toward it. He was scarcely two feet away when the corpse seemed to split down the center and a sinuous blood-red thing flowed out on the moss.

The Bouncer gave terrified squeak, hopped entirely over Ghiorso's body, and continued on without pausing until he vanished behind a cluster of rocks. But the scarlet thing had stopped, and, with one end lifted in the air, waving about slowly, seemed to be listening or watching.

Kathleen caught sight of Quade's white face as he stepped in front of her. He took a stubby, dangerous-looking pistol from his pocket.

CHAPTER III

CLOSE SHOT: Ganymede

THE red thing was moving closer, very slowly. It looked something like a centipede, but its glistening body was plump and cylindrical, and seemed distended. Moreover, all over it grew

wiry, pliant cilia or tubes, and these propelled it over the moss. It hesitated, and coiled up suddenly like a great spring.

Quade's breath hissed between his teeth. A bolt of white flame leaped from the muzzle of the pistol, and simultaneously the monster flashed into the air toward them, disintegrating as it sprang. Quade, his arm about Kathleen, propelled her away, with a wary backward glance. At a safe distance he paused.

"Look yourself over," he said urgently. "Those little feelers can burrow into your body even if they're only an inch long." He examined his clothing carefully, and the girl did likewise.

"What was it, Tony?" she asked at last. "I don't think I've got any on me."

"If you had, you'd know it by now," he told her. "Those are the red leeches. The nastiest things on nine planets." He holstered the gun and started along the Bore, the girl keeping pace with him.

"We'll have to keep our eyes open now," Quade said. "I'd really forgotten about the leeches. If you hear me yell, or see anything coming at your face, put your hands over your nose and mouth and keep 'em there, no matter what happens."

Kathleen looked frightened.

"What do they do?"

"You saw what this did to Ghiorso. If I hadn't killed that leech, every one of those little tubes on its body would have dropped off eventually and become new individuals. They're hardly as long as your little finger then, and they coil up on the ground until some animal—or man—comes along. Then they spring for his mouth or nose, and burrow down inside his lungs or stomach, feeding as they go. They're enormously elastic, and simply eat until only the skin of their host is left. And there they wait until the next course comes by."

The girl shuddered, and increased her pace. The Bouncer suddenly popped up behind a boulder and hopped toward the two. Quade made a threatening gesture.

"Beat it," he warned. "Go chase a meteor. D'you want me to wring your neck?"

"Oh, leave him alone, Tony," Kathleen said. "He's—company."

"He got that leech started after us," Quade grunted. "Company, eh?"

The Bouncer jiggled up and down excitedly.

"More company than you are, you cold-blooded fish," he told Quade, who promptly reached for a stone. Bill squeaked shrilly, and fled to Kathleen, to whose leg he clung fearfully, casting quick glances over his furry shoulders.

"Stop it, Tony," Kathleen said, trying not to laugh. "It isn't his fault. He just broadcasts thoughts. You said so yourself."

"Movie-struck, spoiled brat," Bill declared, and Kathleen's chin went up. Without another glance at Quade she marched along the bank of the Bore.

MARS rose above the horizon, a pale reddish globe larger than the Sun but far less bright. Quade kept looking up the channel, listening intently. At last he hesitated.

"Do you hear something? Listen."

Kathleen was still annoyed, but she cupped her ear with a small hand.

"Yes. I think so. A roaring, very low—"

"That's it! Come on, quick!" Quade caught her arm and hurried her toward a cairn of rocks some distance from the bank. "It's the Bore. The tide. Mars is dragging it around the planet, and we want to be high and dry when it gets here. Step it up, can't you?"

"I—I'm hurrying—fast as I can!" Kathleen gasped, a sharp pain in her chest. The atmosphere, lacking in sufficient oxygen, had told on the two, and they were exhausted by the time they reached the summit of the mound. There they lay panting for breath and looking north along the Bore.

A great wave came sweeping up the channel. Thirty feet high, overflowing the banks and spreading out over the surrounding ground, it came rushing southward, and involuntarily Kathleen huddled close to Quade. The

tidal wave smashed against the base of the cairn, and spray showered the two on its top.

Bill, cowering in the hollow of Kathleen's arm, squeaked faintly and crouched down, hiding his head in ineffectual paws. The girl followed his example, and as the rocking thunder of mighty waters shook the ground, she shut her eyes and burrowed her face into Quade's shoulder. Grinning, he put his arm around her.

The tide drove on south. In its wake came floating huge creatures like turtles, with tall webbed fins standing up like sails on their backs. Flat, reptilian heads lifted, peering around curiously as the things tacked and veered in the winds that the Bore lifted in its wake.

Kathleen had wriggled free.

"What are those?" she wanted to know.

Quade shrugged. "We don't know half the forms of life that exist on the planets, much less the asteroids. Anyway, I don't much care what they are. We'll be at camp soon—and I can find out what Perrin was up to. Shall we get started, Kat?"

She nodded, and they picked their way down the mound. The rocks and moss were damp, but the flood had passed, though the channel was almost filled with a swiftly-racing stream.

The sun went down, and with its going Mars seemed to spring out in startling crimson radiance. Deimos and Phobos, the two satellites, were visible as tiny spots of light near the red planet. The air was colder now, and there was an ache in Kathleen's chest that gnawed painfully, though she did not mention it to Quade.

She was watching her path carefully, to avoid stumbling in the eerie, reddish twilight, and so was Quade. The Bouncer seemed pleased at the semi-darkness, which was no hindrance to his strange eyes. He made frequent hopping excursions among the rocks, and at last returned with great haste and clung to Kathleen's leg, making her stumble. She looked up.

Bill hid his face and shivered, declaring, "What's this? There's something coming!"

QUADE stopped, peering into the gloom. Something certainly was coming—a great white giant that lurched toward them with startling speed. One moment it was a half-seen formlessness emerging from the shadows. The next it was towering above them, an eidolon of shaggy white fur from which two insanely grinning faces glared down at them from a height of thirty feet.

So sudden was its arrival that Quade scarcely had time to draw his gun before a treelike arm swooped down and scooped him up. He was smashed against a hairy, barrel-like chest with an impact that made him go weak and dizzy. He struggled feebly—and realized that his right hand was empty. A metallic thud sounded from below.

"Kate!" he called desperately. "Beat it! Quick! I've dropped my gun. Get to camp and—"

His breath was squeezed out as his gigantic captor whirled and bent. Abruptly he found Kathleen beside him, both of them cradled in the hollow of a great arm.

She was white-faced and shaking, and her stubborn little chin was trembling despite herself. Her breath was warm on Quade's cheek as she gasped.

"Tony! Wha—"

"Hold it, kid!" he told her sharply. "No hysterics. We're safe enough. I know what these things are."

He tried to look down, but could see only a vague, rocky landscape jolting rapidly past as the giant lurched on into the red gloom.

"It's a Hyclops," Quade went on, trying to wriggle free and finding it impossible. The furry arm of the creature, thickly padded with rolls of fat, held him as firmly as though he had been squeezed between two mattresses. "Not dangerous. But its cubs are. We're okay until we reach its den."

Kathleen's teeth were chattering.

"What'll happen then, Tony? Is it—bad?"

Quade forced a laugh he hoped didn't sound artificial. "Not as bad

as all that. Buck up!" He fell silent as a mass of matted fur was thrust into his open mouth, and, coughing and choking, he spat it out. "Ugh! Kate —look up, will you?"

She obeyed. "Yes? What—oh! It's got two heads! I noticed that before, but I thought I was just seeing things."

Above the grotesque, apelike body sprouted double heads, each with its own neck, joining at the shoulders. The skulls were naked, covered with rolls of fat that sagged loosely beneath pied, yellowish skin; and each face reminded Kathleen of that of a microcephalic idiot, though more bestial in contour. A single, luminous eye set in a pit of fat peered down from each head. An elongated muzzle protruded above a clownish, grinning mouth, filled with unpleasant-looking teeth.

"It looks like a lunatic!" Kathleen gasped. "I mean—they do. Tony, are they one or two?"

"Bi-sexual," he told her. "Single body, and two heads, in one of which the male element predominates, and female in the other. Like an earthworm, you know. Hyclops, from Hydra—two or more heads—and Cyclops—one eye in the center of the forehead. I wish I had my gun." At the note of despair in his voice Kathleen twisted around to stare at him.

"I thought you said—Tony, something's going to happen, isn't it? Something pretty bad?"

HE hesitated for a moment, and then shrugged, or tried to.

"I guess so. The Hyclops cubs are the nastiest, hungriest little devils on Ganymede. They're born with the tempers of savages, and as soon as their eyes open, start killing and eating each other."

"Then this—thing—is taking us to its den for food for its cubs?"

"Oh, no. Not intentionally, at any rate. It's a funny thing"—Quade was trying to distract Kathleen's attention so she would not see what was coming into view ahead—"usually only one Hyclops cub survives, the strongest one. As it gets older, it entirely loses its savagery. The adult Hyclops has the most highly developed maternal instinct of any animal. It's also one of the dumbest.

"It sits around watching its cubs kill and eat one another, without making a move to prevent it, and then can't figure out what's happened to the little devils. So it goes out and kidnaps some other animal—and adopts it. Like a mother cat will adopt puppies, sometimes. Unfortunately, the poor beasts the Hyclops brings home get eaten by the cubs, so it's a case of being killed with kindness. This two-headed gorilla that's carrying us loves us both—don't make any mistake about that. But the cubs—that's different!"

Kathleen was looking down, her eyes wide and frightened. The Hyclops was descending the side of a steep hollow, at the bottom of which a couple of gleaming white forms moved sluggishly.

"Here it comes!" Quade whispered. "If I only had my gun!"

The Hyclops reached the floor of the pit and deposited its two captives gently on the ground. Then it simply squatted on its haunches, folding its furry arms across its stomach, and watched them. Looking up at that incredible monster, with its two bloated, inanely grinning heads nodding high above in the red twilight, Kathleen felt a little wave of hysteria sweep over her. Desperately she fought it back.

Quade gripped her shoulder.

"We'll have to dodge the things," he said curtly. "They can't move fast on smooth ground, but if we tried to climb out of this pit, they'd have us like a shot. Come on!"

There were only two cubs, each about seven feet tall, miniature replicas of their parent. But these were lean and rangy rather than fat, and their naked, yellow faces wore vicious snarls rather than imbecile grins. They came purposefully loping forward.

Quade seized Kathleen's hand and fled. It was an insane flight over cracking, gnawed bones that sprinkled the pit's floor, under the brainlessly grinning gaze of the two-headed colossus! Mars was sinking toward the rim of the crater, and when it was gone, Quade knew, they could no longer

escape from the night-seeing cubs.

The monsters made no sound as they followed the two human beings. An agonizing pain was burning into Kathleen's chest, and she would have fallen if it had not been for Quade's arm about her. She turned up a white, perspiring face to him. Her lips parted.

BUT before she could speak a voice from the shadows above.

"I can't go on," it said dispassionately. "I can't, Tony. They'll get us anyway."

Quade looked around quickly, and saw a furry white object bound up, silhouetted against Mars. Something arced through the air toward him, and made a metallic clashing at his feet. He scooped it up, whirling swiftly.

The cold metal of the gun was familiar against his palm. Almost upon him was the bulk of the nearer cub, its monstrous heads nodding, paws clutching out toward him. Quade squeezed the trigger.

The creature exploded in his face. Fur and flesh and whitish, curiously aromatic blood spattered. Without pausing Quade fired another bullet at the other cub, which was racing forward.

His aim was good. There was only the parent Hyclops left now. Quade hastily dug another bullet out of his belt and clipped it into the pistol.

"Triple charge," he said, dragging Kathleen after him up the side of the pit. "I don't want to use it unless—"

Grinning, the Hyclops arose. It paid no heed to the shambles at its feet but lumbered forward, intent on recapturing Quade and Kathleen. Quade steadied himself and shot the monster.

The recoil slammed him back against the girl, knocking them both down. Where the thirty-foot Hyclops had been were two furry legs, still twitching with reflex action.

Groaning, Quade got up, rubbing his shoulder, which had almost been dislocated. Kathleen scrambled up, averting her eyes from the ruined remnants of the Hyclops.

The Bouncer hopped into view and clung to Kathleen's leg, squeaking gently. She bent to caress its head.

"You saved us that time," Bill declared, with an entire lack of modesty. "Tony, I think you owe him an apology. He brought you your gun."

Quade, still examining his shoulder, lifted an eyebrow.

"He got the Hyclops after us in the first place," the Bouncer said inconsistently. "No apology necessary."

A light sprang out, illuminating the scene in vivid detail. Quade whirled, involuntarily lifting his pistol.

"Hold it!" a voice hailed. "It's Wolfe, Tony. Are you okay?"

With a sigh of relief Quade holstered the weapon. "We're safe now," he said in a swift aside to Kathleen. "Sure, Wolfe. Glad you're here. Did you hear the shots?"

A raw-boned, lank figure carrying a flashlight hurried forward and gripped Quade's hand. A mass of yellow hair tumbled over a thin, eager face and sharp blue eyes. Behind Wolfe was Peters, gaunt and hollow-cheeked, frowning anxiously.

"Camp's just over the ridge," Peters said. "There's trouble, and lots of it. Who's this?"

"It's a mechanic," Quade said quickly. "Let's have your helmet, Peters." He handed it to Kathleen, who slipped it over her brown curls. "Keep this quiet, boys. She's a stowaway, and you know what that means."

THE others nodded. "Right," Wolfe said. "Come along, Tony. We'll talk as we go. I thought I had bad news, but Peters just got here, and he's got worse."

Kathleen was hard put to it to match the long strides of the men.

"What about Perrin and Ghiorso?" Quade asked. Quickly he explained what had happened.

Wolfe whistled. "It's Perin's fault, the dirty swine. We landed on Ganymede and started to build the set *muy pronto*, and when we'd scooped out a pit for the amphitheatre—we hit radium! Lots of it—the biggest find since Callisto. Way I figure it out, Perrin sent you the message and then disabled our ship and our radio, so we were stuck. Then he hiked with Ghiorso."

"What the devil!" Quade growled. "What was his game?"

Peters broke in. "He got back to the Moon in your cruiser and sold his information to Sobelin. The financier, you know—the boss of Star Mines Company. And Sobelin pulled some wires and got your option cancelled. He's bought Ganymede lock, stock and barrel."

Quade ruffled his hair with both hands.

"Lord, oh Lord! Did they—"

"We've been ordered off Ganymede. Von Zorn got wind of the affair, and he's nearly crazy. Started a lawsuit against Sobelin in your name. You were working for the chief when the radium was found, and you had an option on the asteroid, so—"

"That means trouble," Quade said. "Remember the old Sobelin-Transport scrap over Ceres? It was a regular war between the two companies, and they nearly wrecked Ceres before they'd finished. Nearly a thousand men killed on both sides before the government stepped in."

"There's nothing Washington can do here," Peters declared. "It's dirty politics, but legal enough. What'll *we* do, Tony? That's what I'm worrying about."

Quade hesitated, snapped his fingers. "We'll have to gamble. We'll go back to Eros. It's still my property for a few weeks. Is your ship repaired, Wolfe?"

The lanky blond nodded.

"Yeah. I got the parts I needed from Peters."

"Swell. We're heading for Eros, then. All of us! We'll beat Sobelin, Perrin, and the whole damn System if necessary. The set's half set up—well, we'll just have to rush and finish the job and take the pix before the ether eddy hits Eros. Come on!"

CHAPTER IV

DISSOLVE TO: Hollywood on the Moon

IN the next few days Kathleen came to know a new Tony Quade. He seemed like a machine, fired with inexhaustible energy. He had no need to drive the men, for they worked like demons, but he drove himself without pause. The job had to be done! The polar city—the Eros set—had to be completed! The sequence had to be filmed before the ether eddy wiped out the asteroid!

Blast out the lakes and canals—whittle down the peaks and mounds with atomic blasters—file them into the shape of gigantic buildings, towering to the sky—faster, faster, faster!

And inexorably the ether eddy swept in from space, a black blot of nothingness. Quade had to cancel some of his plans. The central palace was left incomplete. Many of the lakes were dry. The node would be reached sooner than anyone had expected.

The deadline was close—too close. The two great ships and Quade's little cruiser hung out in space at last, cameras grinding, while Eros revolved slowly beneath them. Quade kept casting worried glances at a little starless hole that was moving slowly across space toward the asteroid.

He was in the cruiser, with Kathleen beside him, the Bouncer squatting in a corner watching them with curious eyes. The girl had insisted on helping. She had mastered enough technique to learn how to operate one of the three-dimensional cameras. The revolving double-shutter provided the necessary stereopticon effect, and her main job was to keep the polar city within the range of the finder. Quade's camera possessed a telephoto lens, which would bring the set into a magnified close-up view.

"It's too late," Bill said, hopping to Kathleen's side and embracing her leg. "We waited too long."

She turned worried eyes to Quade.

"Do you think so, Tony? Everything's ready, you know."

He pointed.

"Look at the ether eddy. I cut the line too close, Kat. The explosion's due now, but—"

The blot of shadow swept closer. The artificial polar city shone in the sunlight far below on the surface of the asteroid—and without warning it happened. A little jet of smoke shot up,

the forerunner of the explosion that would blast the city into space. Quade bent over his keyboard—

Eros was blotted out! It vanished—puffed out into nothingness! There was nothing spectacular about it; one moment it was there, spinning whitely among the stars—then it was gone as the eddy enveloped it. Quade cursed.

The eddy drifted on. Where it had been was only vacant, starlit space. A little puff of dust, that was all. Where Eros had revolved in its orbit was nothing.

"My luck," Quade said bitterly. "Once in a thousand years the System gets an ether eddy. And it just has to do this." He shut off the camera, stood up. "Well, it's all over, Kate. I'd land you on Earth, but I haven't enough fuel. And I couldn't buy an ounce, now. You're looking at the worst flop in the Galaxy."

The Bouncer was cowering in a corner, scrubbing at his eyes with frantic paws. Kathleen glanced at it and turned a level gaze on Quade.

"Buck up, Tony. You've said that to me often enough. You're not licked yet, are you?"

"Yeah," he grunted. "You're darn right I'm licked. I don't mind for myself so much, but there's my crew—they've stuck with me for years. And you, too, kid— thought I could help you out. But—"

BILL was behaving strangely. The Bouncer scurried to the nose of the ship, pressing his face against the transparent portion, and then hopped back to cower in a corner. Kathleen eyed him.

"Tony," she said suddenly, "do me a favor. Develop the film, will you?"

Quade stared.

"What's the use? It'll just be blackness. Von Zorn can't use that."

"I've an idea. Please, Tony. The process takes only a minute."

He shrugged.

"All right. Tell the gang to head for the Moon." He unhooked a can of film and went into the rear compartment, while Kathleen turned to the televisor. Presently Quade called her.

"All set. Come in, Kate."

Bill at her heels, she went through the door. The developed reel of film was on the projector, and Quade started it unrolling as she entered. On the screen Eros sprang out in sharp detail.

"Long shot. Here's where the telephoto lens comes in."

A city leaped into visibility, in natural colors, a little blurred.

"I'll speed it up a bit," Quade said. "The two pictures have to be transposed so you see one with each eye. That gives the three-dimensional effect."

A puff of dust appeared—and the

[Turn Page]

screen went black. Simultaneously the Bouncer became violently excited. He leaped up, almost hitting the ceiling, and squeaked frantically.

Quade said, "That's funny. I wonder—"

Bill declared, "It's his eyes. He sees more than us."

"Think so?" Quade's face wore an incredulous expression. "D'you really think that's it, Kate? Maybe—I'll try the infra-red."

He manipulated the projector, but no change came on the screen. "Well, then, the ultra-violet." He flicked lenses into place.

The Bouncer quieted, staring around in an absent fashion. He hopped to Kathleen's side and tugged at her hand. But she paid no attention. She was staring, open-mouthed, at the amazing spectacle on the screen, brought into sharp visibility by the ultra-violet filter.

"By the nine moons of Saturn!" Quade gasped hoarsely. "Do you see it? Kate—am I crazy? Do you see it too?"

"Yeah," she managed to whisper. "But I don't believe it."

His voice was hushed.

"Do you know what we're looking at? *The fourth dimension!*"

A planet was visible on the screen, growing rapidly in size as it revolved. A planet that was unlike any other in three dimensional space. For it was not a sphere. It was a dozen spheres —a thousand—Kathleen blinked in amazement.

"I—Tony, I can see inside of it! And all around it!"

"We're looking into fourth dimensional space," Quade gloated. "So that's the explanation of the ether eddy. It marks the orbit of a body in another continuum—a fourth dimensional continuum. It's a hole in space, a hole created by a planet in another Universe. Look at that!"

THE amazing world, or group of worlds, drew closer. Fantastic, unbelievable colors shocked Kathleen's eyes. The surface of this planet was covered with incredible things.

"Animal, vegetable, or mineral?" Quade asked gleefully. "Lord knows! It doesn't matter. Whew, what a break! And I've got two dozen reels of that thing, taken from different angles. Kate, do you know what Von Zorn will pay for this?" He didn't wait for her answer. "He wants a super-colossal picture—well, this is super-galactic! There's never been anything like it in the System. A fourth-dimensional flicker! Oh, sweet Saturn!" He scooped up the startled Bouncer and planted a kiss on the creature's astonished face. "You'll get a diamond-studded collar for this. And Kate—I'll see Von Zorn gives you the fattest role he's got."

"Will Von Zorn pay through the nose for this!" Bill declared, struggling to escape from Quade's grip. "And will Sandra be mad!"

"Who," Kathleen asked, "is Sandra?"

The Bouncer plopped to the floor, remarking, "I wonder if she's jealous?" At which Kathleen turned fiery red and hastily went into the other compartment, leaving the chortling Quade to watch the amazing film.

HOLLYWOOD on the Moon was in a furore. Von Zorn had seen the fourth dimensional films, and had promptly called for his check-book. His apish face was wreathed in smiles as he ordered a screen-test for Kathleen and fed the Bouncer sweetmeats.

He was fascinated by the little creature's mind-reading abilities, but Quade carried Bill off quickly and handed him over to the Psychology Bureau, after enlisting a government agent's aid. Quade had an idea. He had been worrying about the impending Sobelin-Nine Planets battle, especially as Von Zorn showed no inclination to retreat.

"It doesn't matter what you want," the chief had told him firmly. "There's a fortune in radium on Ganymede, and my lawyers tell me I've as much right to it as Sobelin. More, because you were working for me when you took out the option."

Later Quade returned to Von Zorn's office with Kathleen, Bill, and the government agent. The chief was grinning

fatuously as he talked with Sandra Steele, who was turning on him fifty thousand watts and the full battery of her violet eyes.

Von Zorn glanced up, and a curious look came into his face.

"Ah," he said, fingering his scrubby mustache. "Miss Gregg. I have rather bad news for you, I'm afraid."

Kathleen looked startled. "Didn't the test come out all right? The cameraman said—"

"Uh—it was fine. Yes. But circumstances have arisen—" He glanced sideward at Sandra. "We will be unable to use you in pictures. Your passage back to Earth will be paid, of course. I'm sorry."

Quade took a step forward, glaring at Sandra.

"You chiseling little pig," he told her angrily. "This is your doing, isn't it?"

Sandra smiled as Von Zorn stood up.

"Don't talk that way to Miss Steele," he snapped. "You were well paid for your pictures. I'm grateful—sure. But that doesn't give you any license to run Nine Planets, or to insult Sandra."

"I see," Quade said. "Okay. I'm sorry, Kate," he said to the girl, whose eyes were wet despite the stubborn firmness of her chin. "You deserve a better break."

She turned blindly to the door and went out. The government agent came forward, digging into a pocket of his black uniform.

"Here's something for you," he said, handing Von Zorn a paper. "And, believe me, I'm glad to give it to you, mister." He winked at Quade.

The chief stared at the document.

"What the devil! Quade—what is this? A restraining order—Washington can't do this! I've as much right to Ganymede as Sobelin! You can't freeze me out this way!"

"Sobelin's getting one too," Quade said with satisfaction. "Neither of you has any right to Ganymede. Remember the old property law—the right of eminent domain?"

"But—but—Ganymede isn't inhabited by intelligent life! Not over the

eighth level, anyway."

"Sure it is," the agent interrupted. "This little fellow here is probably smarter than you are." He indicated the Bouncer. "He doesn't look it, but he's just over the eighth level. Mr. Quade called me in and wanted an intelligence test made. And it turned out he was right. Ganymede is already inhabited by these jiggers—which are over the eighth level of intelligence—so the asteroid belongs to them, and Washington says so. And I'll bet neither you nor Sobelin want to buck the Government."

VON ZORN gulped. "Uh—no, of course not. You say Sobelin won't get anything?"

"He hasn't a claim. Washington will establish a colony on Ganymede, mine the radium, and use it for the benefit of the inhabitants — exterminate the dangerous animals and give these little fellows the break they deserve."

"Oh, boy!" Bill said, although it wasn't plain whose thoughts he was broadcasting.

Suddenly Von Zorn grinned.

"Okay. As long as Sobelin is out too. I don't care so much about the radium —we'll clean up on *Space Bandit*, anyway—but I wasn't going to see that crook put anything over on me. Congratulations, Bill!" And he deposited a sweetmeat in the Bouncer's open mouth.

"I'm glad you're taking it that way," Quade said. "You—haven't changed your mind about Kate, though?"

Von Zorn hesitated and glanced at Sandra. At the look in her violet eyes he compressed his lips.

"I'm sorry, Quade. I can't use her. But you've a good assignment on *The Star Parade*, and—"

Without another word Quade went out. He found Kathleen at the turn of the corridor, dabbing at her eyes with a futile bit of lace.

"Buck up!" he said, putting his arm around her. "Here—use this." And he applied a large handkerchief capably to her face.

"Don't—don't rub my nose off!" she gasped. "Oh, Tony, I'd like to scratch that woman's eyes out. She makes me sick."

"I don't see how Von Zorn managed to fall for her," Quade admitted ruefully. "But he did. Eats out of her hand."

The door of the chief's office banged open suddenly. Furiously voices were raised in bitter argument. Abruptly the Bouncer emerged and hopped frantically along the corridor. Behind him Sandra Steele raced purposefully, an angry grin on her face. Bill squeaked with fear and took shelter behind Kathleen's ankles.

Sandra made a snatch for Bill.

"Give me that — that thing!" she gritted. "I'm going to wring its head off."

"You're not!" Kathleen told her sharply. "Leave him alone. Tony—"

But before Quade could move Sandra had whipped out a vicious hand and slapped Kathleen smartly.

Kathleen's chin came up. She brought around a capable hand, clenched into a hard little fist, and punched Sandra Steele in the nose. With an incredulous scream of pain the screen star staggered back and came violently in contact with the wall. She slid down to a sitting position, spitting like a cat.

"Had enough?" Kathleen asked belligerently, stepping forward. "You leave Bill alone!"

It seemed Sandra had had enough. She scrambled to her feet and made off, trailing a string of vituperation that made Quade's ears burn. Abruptly he became conscious that Von Zorn was standing near by regarding Kathleen.

"Jupiter!" he gasped. "That's torn it!" But he thrust himself between Von Zorn and the girl, fists clenched.

THE chief waved him aside, his lips twitching strangely. "Ah — Miss Gregg," he said in a muffled voice. "I —uh—fear Miss Steele will be unable to appear in *The Star Parade*. Inasmuch as your test turned out so well, I'd like to offer you the role." He coughed violently. "You're a very capable person," he told the astounded Kathleen, and hurried away.

Quade stared at him in amazement, and then turned to eye Kathleen's delighted face. "I guess I'm hearing things," he murmured. "You sock Sandra—and get her part. For Pete's sake!" He looked up as a voice said:

"For Bill's sake, you mean. I'm commencing to think that little gadget is smarter than any of us." The government agent was standing before them amusedly eying the Bouncer, who was clinging to Kathleen's leg and squeaking with apparent delight.

"You can't tell me he isn't laughing," the agent chuckled. "And he's got a right to. Know what happened?"

"What?" Quade asked. "It must have been plenty."

"It was. After you went out, this dame Sandra Steele started making up to Von Zorn, and he pulled her on his lap and asked her for a kiss. And just then Bill bounced up to the desk and said, 'If you think I'm going to kiss that repulsive monkey face of yours, you're crazy!' "

The agent spluttered with delight.

"What a scrap! Von Zorn dropped the dame like a hot potato, and they lit into each other hot and heavy. 'So that's what you think of me,' he yells. 'A monkey-face, eh? Been making a sap out of me, have you?' And then she started after Bill, and Von Zorn after her—"

"This is the life!" the Bouncer interrupted, jiggling excitedly. "How about a kiss?"

The agent hastily turned away. "I know *I* didn't think that," he observed over his shoulder. "So—"

Neither Quade nor Kathleen was paying any attention to him. Bill, however, bounced up to the ceiling and declared triumphantly, "She loves me! She loves me! She loves me—"

IN THE NEXT ISSUE:

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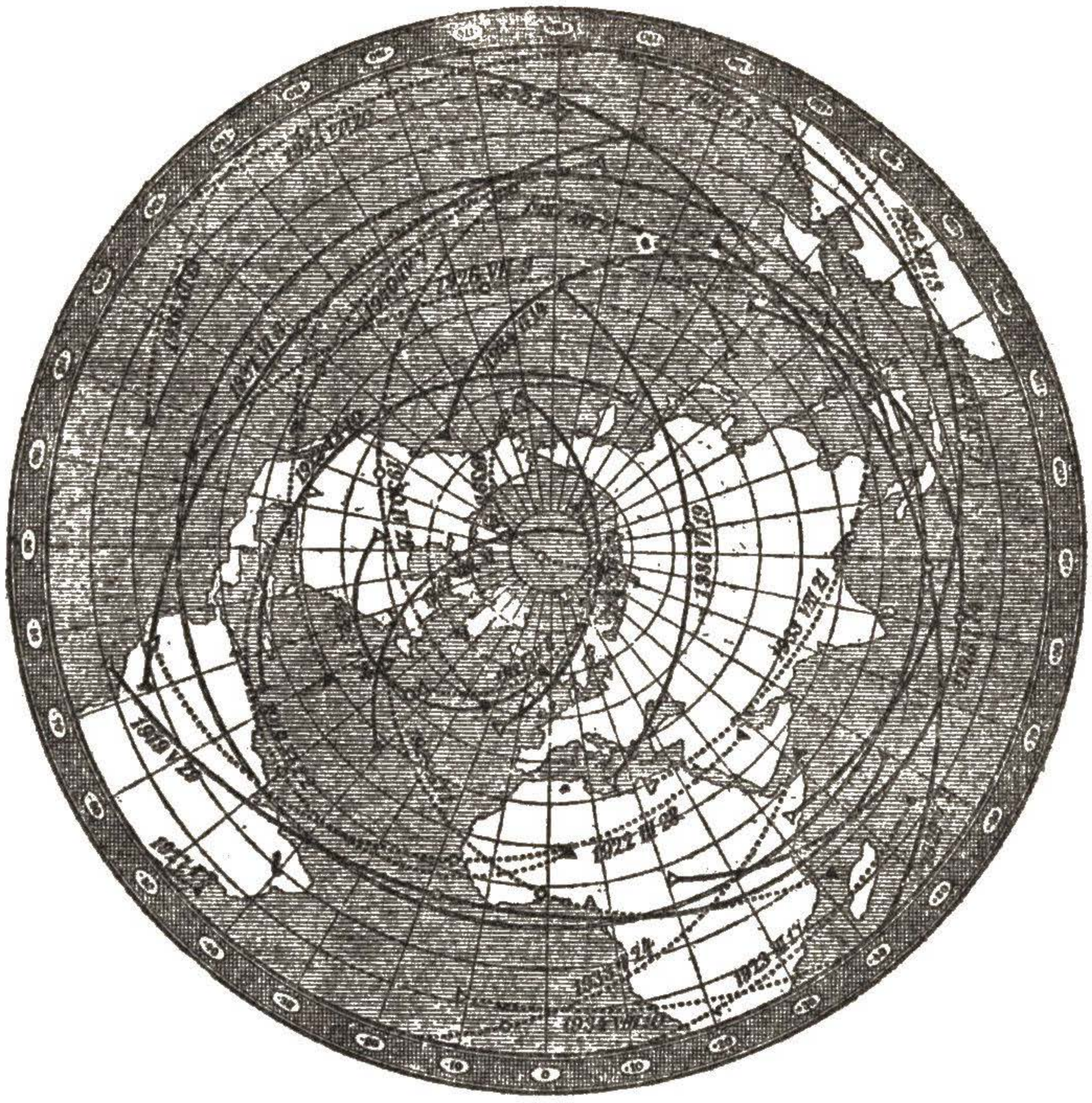
THE DUAL WORLD
A Novelette of Interplanetary Thrills
By ARTHUR K. BARNES



Cosmic Rhythm—ECLIPSES OF

ON JUNE 19, 1936, parties of astronomers at various points on a line across Siberia and Japan were anxiously awaiting a total eclipse of the sun. They had spent many months preparing for it; whether this labor would be of any avail depended on the sky being clear during a fateful two minutes.

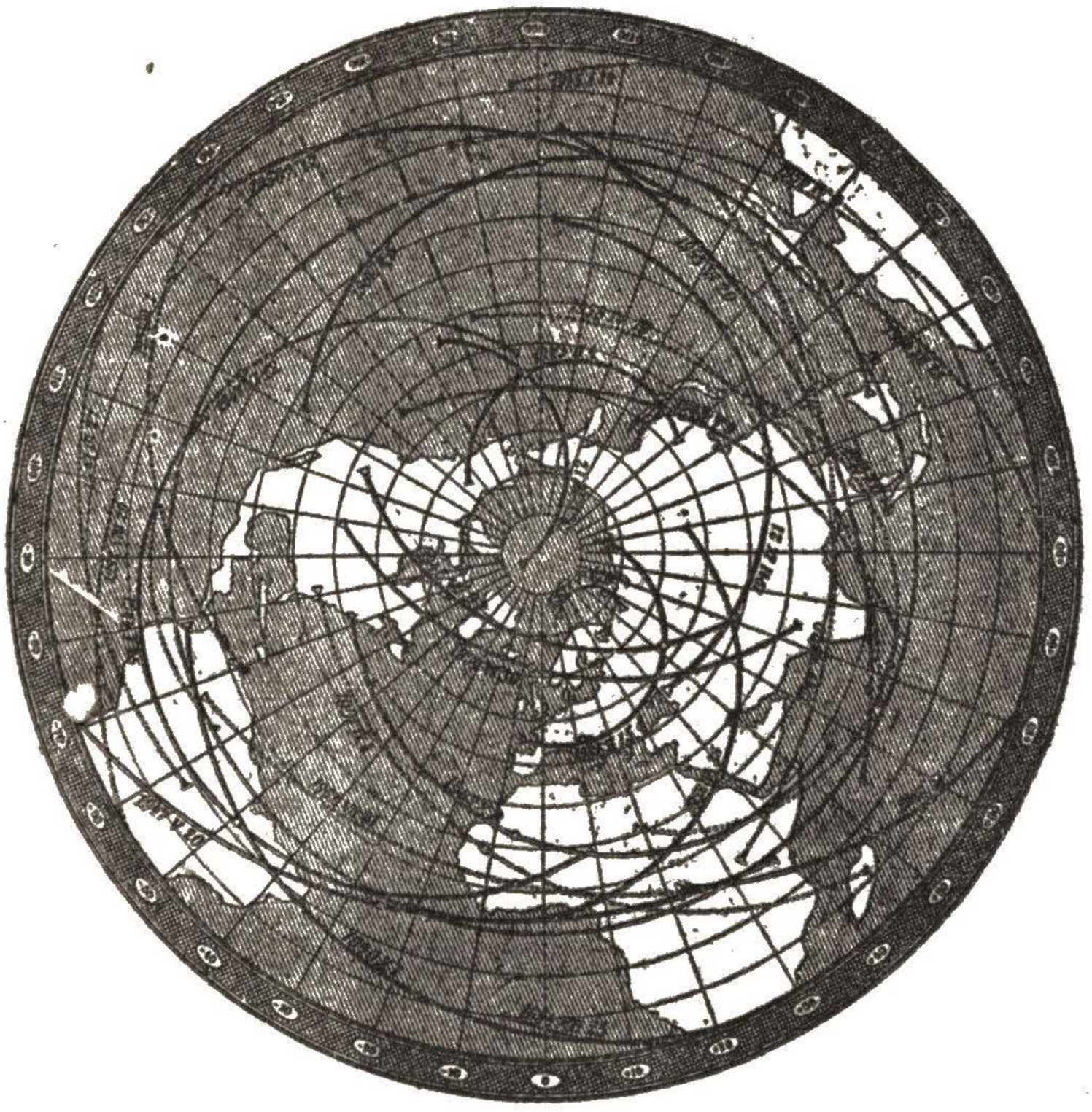
The weather was kinder on the whole than on many previous occasions. Those who were successful brought home enough photographic records to keep them busy for a year, measuring and studying.

A meeting was held at the Royal Society recently, at which the results of the British expeditions were announced and discussed. But this would only interest specialists familiar with the problems they were trying to solve. So I am going to talk about eclipses in general.

The eclipse is caused by the moon covering up the sun. By a coincidence, which is very fortunate indeed for astronomers, the moon is just large enough to do this. More strictly the moon can just cover the sun if it is at a mean distance from us; sometimes the moon is nearer and sometimes farther away than the average and it is very nearly an even chance whether it covers the sun completely or leaves a ring of sunlight unhidden.

I shall speak only of eclipses in which the sun is totally hidden, since these are the most interesting and most spectacular. Owing to the closeness of the fit the moon covers the main body of the sun and cuts off its dazzling light, but leaves unhidden the immediate

A Brand-New Article by SIR



△ *rising point*
▲ *midday point*
o *setting point*

THE SUN —And How They Are Calculated

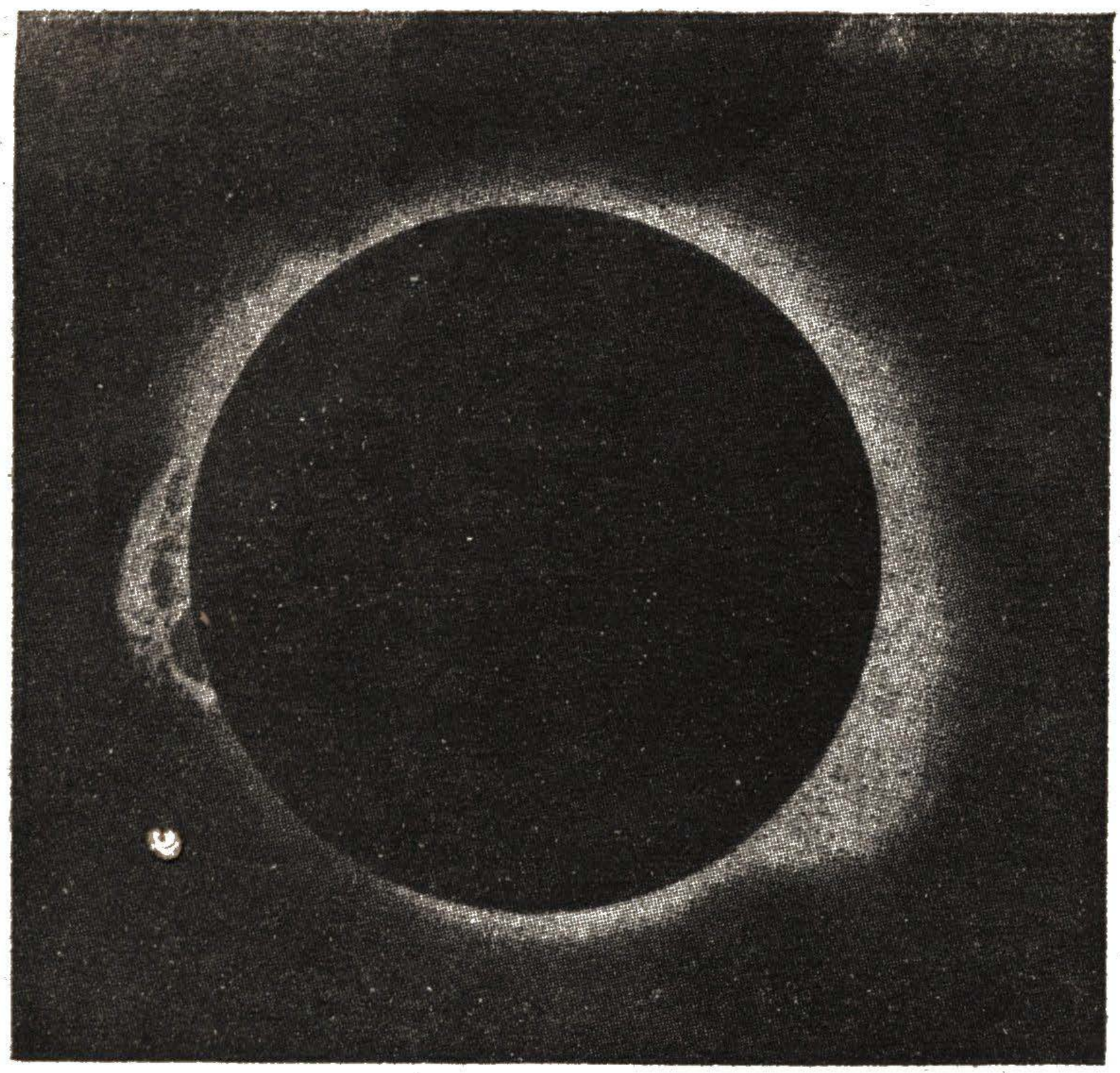
surroundings. We can see red prominences like flames a hundred thousand miles high, hovering over the solar furnace which is hidden. Around all there is the corona—a silvery glow whose streamers stretch far outward to several times the sun's diameter. An eclipse is our opportunity for studying these appendages of the sun, which are ordinarily lost in the glare.

When, as all too rarely happens, the eclipse takes place in a perfectly clear sky, it is a grand spectacle. In four attempts I have only seen it once in perfect conditions. The daylight fades slowly at first, then more suddenly—like the lowering of lights in a theatre. A diffuse twilight fills the sky and landscape, and makes all around seem unreal. Where the sun had been, a strange sight appears—a ring of silver light continued outward by fainter shafts.

It is the unimaginable opalescence of the light which makes it so awe-inspiring. If we can spare a moment to turn our eyes away, we see that the brighter stars have appeared in the sky. After what seems a timeless pause, the eclipse ends as suddenly as it began. A ray of sunlight breaks forth from behind the moon, and the spectacle fades. A moment later Nature has taken up her daily course again.

These total eclipses are not rare: they happen about twice in three years. Last year on June 8 there occurred an eclipse lasting over seven minutes, which is the longest for more than a thousand years. But the best part of its track lay in the Pacific Ocean, so it was not favorable for astronomers who need solid earth to erect their instruments on.

ARTHUR S. EDDINGTON



Photograph taken at Principe of the 'Einstein' eclipse, May 29, 1919 (by Sir Arthur Eddington and E. T. Cottingham) showing a large red prominence on the left

Each eclipse is seen only from a small part of the earth. When we look down from an airplane we see the shadow of the plane on the ground following us, and to anyone standing in the shadow the sun is, for a few moments, obscured by the plane. Similarly in order to see the sun obscured by the moon we must stand in the shadow of the moon.

At typical eclipses the moon's shadow is about eighty miles wide; and as it sweeps over the earth it defines a belt of that width some thousands of miles long, from which alone the eclipse is visible. Eclipses at any one place are therefore rare. London has only had one since the year 1140. In the British Isles generally, the last total eclipse was in 1927, the one before that in 1724, and the next will be in 1999 in Cornwall and the Scilly Isles.

HISTORICAL RECONSTRUCTION BASED ON ECLIPSES

There are very early historical records of the occurrence of eclipses. Records in China go back before 2000B. C. There is a somewhat doubtful record of an eclipse in 1063 B. C. on a Babylonian tablet, but the earliest that we can certainly identify was in 763 B. C. in Assyria. Such records have played an important part in fixing the chronology of those early times, especially in Persia, Babylonia and China.

To appreciate this, imagine that a war has wiped out our present civilization, and that some thousands of years hence scholars are trying to reconstruct the history of our times from the scanty relics and traditions which survive. What a find it would be to discover a record saying that in the eighteenth year of King George V a total eclipse of the sun was seen.

Astronomical calculation would furnish the dates of eclipses visible in Britain, and it would be deduced that in three centuries the only possible dates of accession of George V were 1707, 1910, and 1982. Other evidence might well be sufficient to decide between these alternatives. Historians would then have a definite known date as a basis for the chronology of the period.

The power of scientific calculation is shown perhaps more strikingly in eclipse prediction than in any other application. We can foretell eclipses thousands of years hence, or calculate those which happened thousands of years ago. But the most ancient eclipses

do not fall quite into line with the calculation; the date is exactly right, but the calculated place is somewhat east of the spot where the eclipse is recorded to have happened.

This deviation is of great scientific interest. We have to remember that any place on the earth is being carried round by the earth's daily rotation. To find where a particular region was at the time of the eclipse—whether it was in the moon's shadow, or to the east or west of it—we have to trace back the rotation. For the most ancient eclipses we go back a million years: that is to say, we must trace back a million rotations of the earth. If the rotation has not run quite uniformly through all that time, the region will have got behind or ahead of its expected position.

Thus the old eclipse records test the earth's accuracy as a time-keeper. They show that it is not keeping perfect time; but the days now are a little longer than they were two thousand years ago. That was not unexpected; because the tides, raised by the moon and sun, act as a brake on the spinning earth and must gradually slow down its rotation. But it is only by the ancient eclipse records that we can ascertain how much this slowing down amounts to.

I am afraid that those who find the day all too short and would like it lengthened, will not derive much encouragement from the actual figures. The rate of lengthening is such that a hundred and twenty thousand years hence the day will be one second longer than it is now.

SCIENCE AND THE SUN

Coming to more recent times, the eclipse of 1868 was noteworthy as the first at which a spectroscope was applied. I will mention only one result out of many. With the spectroscope we can learn something of the chemistry of the sun and stars, recognizing the elements present. Atoms and broadcasting stations have one thing in common—both emit electric waves.

The atoms *are* little broadcasting stations emitting those ultra-short waves which we call light; and we distinguish, say, hydrogen from calcium by their wave-lengths, just as we distinguish radio stations by their wave-lengths.

[Turn Page]

SIR ARTHUR S. EDDINGTON

THRILLING WONDER STORIES is honored to present ECLIPSES OF THE SUN, by Sir Arthur S. Eddington, the second in its great series of popular science articles by world-famous authorities.

Sir Arthur S. Eddington, Plumian Professor of Astronomy at Cambridge University, is internationally recognized for his distinctive work in the field of astronomy.

The power of scientific calculation is demonstrated more strikingly in eclipse prediction than in any other application. Eclipses are the most majestic of all celestial phenomena, so it is only fitting that their discussion should serve as the basis for this informative and absorbing article.

Sir Arthur S. Eddington has written several volumes on various phases of astronomy. Best known of his books—which we recommend enthusiastically to our readers—are:

The Expanding Universe, Nature of the Physical World, Space, Time and Gravitation, Stars and Atoms, New Pathways in Science, and Stellar Movement of the Structure of the Universe.

Sir Arthur S. Eddington

At the 1868 eclipse there was seen conspicuously a yellow light whose wavelength did not correspond to any known atom; we had, as it were, picked up a strange foreign station for the first time. It was concluded that this must be a new element. The element was named "helium," which means "the sun-element." Many years later—in 1895—the "sun-element" was found on the earth, recognized again by its wavelength.

The scientific importance of helium is very great, and with the memory of the *Hindenburg* disaster still fresh, I need scarcely recall to you its practical use as a non-inflammable substitute for hydrogen in airships. But we first got to know of it as a constituent of the sun.

You may wonder why it is still necessary to spend so much labor on observing eclipses. It is natural that we should wish to find out all we can about the structure of the sun and its appendages—especially since the sun has so great an influence on conditions on our planet. But there is also a wider interest. In these regions round the sun we find matter a million times more rarefied than in the most highly exhausted vacuum obtainable on Earth.

We learn, therefore, not only about the sun, but about the physics of matter generally, by observing matter under conditions much more extreme than a physical laboratory can reproduce. More and more today astronomy plays the part of extending the range of physical experiment. We wring from matter its secrets by subjecting it to extreme heat, extreme cold, high compression, high rarefaction, and so on. When the limits possible in a terrestrial laboratory have been reached, we turn for still more information to the laboratories in the heavens, where hotter furnaces and higher vacua are to be found, and a vaster scale of experiment is in progress.

TESTING EINSTEIN'S THEORY

I am not a regular eclipse observer, and my experience is not so wide as that of some of my colleagues; but it includes the most dramatic eclipse of all, in May 1919, when Einstein's theory was put to the test and found to be confirmed. I do not think the importance of Einstein's theory has been exaggerated; after twenty years it still seems, as it did then, the greatest revolution in physical science since the time of Newton; and the new outlook it introduced is still bearing fruit abundantly. It was, however, then on trial. I suppose that in the long run, so great a change of thought could not stand or fall by a single test; but the test we were to carry out at the eclipse was as nearly crucial as one could demand.

So in 1918, in the midst of war, active preparations for the expeditions were begun at Greenwich. There was perhaps an added touch of drama in the fact that our national observatory was undertaking to follow up observationally the theory of an enemy scientist. The test to be performed has been described as "weighing light." It was predicted that the track of a ray of light near the sun would bend under the weight of the light, much as the track of a bullet bends toward the earth by the weight of the bullet.

If light rays are not straight we must see things crooked; thus stars near the sun should be seen crooked. The aim was to photograph such stars—a procedure only possible when the sun was darkened by an eclipse—and measure the crookedness or distortion of the starfield, if any. The quantity to be looked for was moderately large from an astronomical point of view—about a second of arc. A second of arc is what a threepenny bit looks like when it is a mile away. (At least it used to be so; but the new threepenny bits are too large, and I feel a grudge against the Coronation coinage for spoiling a favorite comparison.) Anyway, in astronomy we are used to measuring much smaller angles than that.

In 1919 the expeditions set forth, two astronomers going to Brazil, and two to the Isle of Principe in West Africa. The Brazil party had perfect weather; through incidental circumstances there was a delay in reducing their observations, but in the end they provided the most conclusive confirmation. I was at Principe. The eclipse day came with

rain and cloud-covered sky that almost took away hope.

Near the time of totality the sun began to show dimly through the cloud, and we carried through the program hoping that the conditions might not be so bad as they seemed. The cloud must have thinned before the end of totality, for amid many failures we found two plates showing the star-images desired.

One of these two we measured on the spot, not entirely from impatience, but as a precaution against accident on the way home.

Three days after the eclipse, as the last line of the calculation was reached, I knew that Einstein's theory had stood the test, and the new outlook of scientific thought must prevail.

FORECAST for the NEXT ISSUE

BOY meets girl! Boy loses girl—and a space ship—and a cargo of rare Venusian monsters! It all begins when Tommy Strike, intrepid interplaneteer, strikes out for himself and defies the great "Catch-'em-alive" damsel, Gerry Carlyle.

THE DUAL WORLD, a novelette by ARTHUR K. BARNES, complete in our next issue, brings you the scintillating account of the merriest, gayest romance ever seen on any of the nine worlds. And there's a cargo of thrills in store for you before Tommy Strike helps himself to one of Saturn's Rings and circles Gerry Carlisle's finger with it.

* * *

If the world could have listened in on that talk between Sigmund Kohl and Richard Prince it might have judged Kohl mad, and locked him up. Or—it might have gone wild with joy and proclaimed him the greatest benefactor mankind had ever known.

A flat pint bottle of plain glass, with a faintly pinkish fluid in it, was the subject of their discussion. Give the few precious ounces to the world—or not? The decision and its aftermath is revealed in TERROR IN UTOPIA, a novelette by PAUL ERNST.

* * *

A scientific murderer eliminates the passengers of a space ship, one by one, by ingenious methods. The chief suspects are inhabitants of four planets—Earth, Jupiter, Mars, and Venus! With all the clues before you, can you match wits with a desperate killer of the next century and put your finger on the guilty individual?

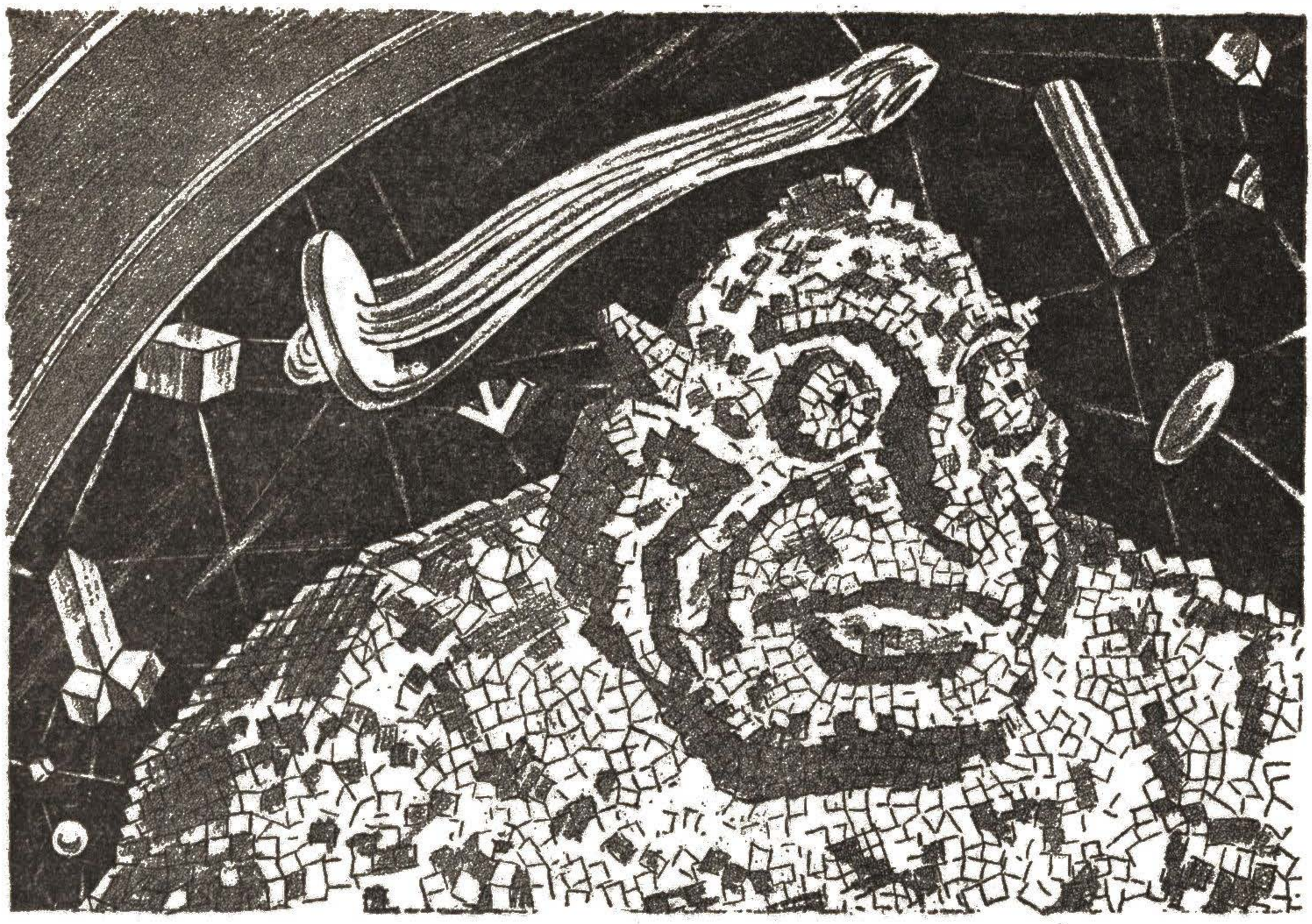
There's a challenge for you in MURDER IN THE VOID, a novelette by EDMOND HAMILTON.

* * *

The special article for next month's issue is CONQUEST OF THE DEEP, by WILLY LEY. It's a dramatic account of submarine exploration, typical of the features that make THRILLING WONDER STORIES truly The Magazine of Tomorrow.

* * *

Next month's issue of THRILLING WONDER STORIES also brings you other novelettes and short stories, plus a star parade of features and departments.



THE INFINITE ENEMY

The World's Fate Hangs in the Balance When Scientific Genius Unlocks the Gateway to a Lost Universe and a Fantastic Giant of Cubes!

By JACK WILLIAMSON

Author of "The Ice Entity," "Islands of the Sun," etc.

CHAPTER I

Into—Enigma!

THIS was going to be a tough proposition. But Kerry Lundoon summoned a happy whistle to his lips, and walked jauntily up to the guarded gate of the Kallent Memorial Foundation.

"You get the Winship story, Lundy," his editor had ordered. "And I don't care how—bribe a guard, or bump him off. I want to know what Winship is doing inside that fence."

"Yes, chief."

"Don't 'yeschief'—get the copy! For fifteen years, Winship's laboratory has been a mystery. Ever since the atomic explosion, or whatever it was, that killed Dr. Kallent and his daughter, back in 1948. Cedric Kallent was the biggest scientist of his time. And Roger Winship seems to have carried

"It's alive!" Kerry Lundoon sobbed

on, behind that fence, from where Kallent left off.

"I don't know what he's got. The rumors say atomic power that could wreck the coal and oil interests, if Winship would let it go. They say gold transmuted out of zirconium, that could wreck the world's financial system—if Winship weren't too philanthropic to do it. They say a ship to fly to Mars.

"Well, I'm fed up with rumor and mystery. I want facts. Get 'em, Lundy. Or don't come back."

"Yes, chief," he had said.

The fence certainly looked formidable enough. A triple barrier, surrounding New Jersey's most inaccessible thousand acres. The outer one was of heavy steel mesh, twenty feet high. The next of glistening barb wire, hung with ominous signs: *Danger—44,000 Volts!* The inner one was a high wall of sheet steel that shut out the view of everything beyond.

"Mr. Kerry Lundoon," he announced himself, "to see Dr. Winship." Seeing the forbidding glint in the eye of the guard, he added impressively, "I'm the science man from the *Planet*, for the interview on Dr. Winship's atomic discoveries."

The massive and muscular ex-pugilist who defended the gate uttered a porcupine grunt.

"Pass?" echoed the newshound. He patted the pockets of his immaculate dark suit. "Of course he sent me one. Here it is!"

GRINNING cheerfully, he presented the card. The big man inspected it, grunted, and dropped it into a pneumatic tube. Thirty seconds later it dropped back into the receiver. The guard read a note scrawled on it, deliberately tore it in half.

"Neat forgery, Buddy," he commented. "But the ultra-violet will tell."

"Better luck next time," grinned Kerry Lundoon.

"My advice, Buddy," scowled the guard. "Stay away."

That night the moonless sky was overcast. An hour after midnight, a silent plane dipped briefly below the ceiling, at three thousand feet. Kerry Lundoon stepped out of its cabin, caught his breath, and pulled the rip cord of his parachute.

The ceaseless throb of a great power plant came up to his ears. Floodlights poured white against the blank mystery of huge windowless buildings. Black shadows clotted clumps of trees. The forbidden thousand acres floated toward him.

"In!" he murmured, cheerfully. "And how I get out is *their* problem!"

He tugged at the 'chute's rigging, spilled air to sideslip toward a mysterious construction near the middle of the grounds. It was shaped like a tremendous wheel, one hundred feet in diameter and twenty in thickness, lying on its side. Dense shadow made a black pool within its rim. Overalled men were busy under the floodlights outside, loading tools and equipment into trucks.

"Eh?" muttered the newshawk. "Something just finished. The Martian flier, maybe? We'll see."

Uprushing air whispered softly against the cords. He sideslipped again. The pool of shadow was beneath him, expanding. He crossed his legs, relaxed for the impact. Hard metal smacked up against him, and the silk fell over his sprawled body.

"Greetings!" he whispered. "Doc Winship!"

He unbuckled the harness, kicked off the folds of the parachute, and cautiously rose to his feet in the darkness. A flat metal deck was beneath him. The rim of the wheel made a heavy metal bulwark about the edge.

"What is it?" he muttered. "But, first thing, a few good pix."

Leaning over the massive rim, a tiny automatic camera in his hand, the reporter ignored a sudden powerful throbbing that began beneath him—until an avalanche of white-hot agony struck him abruptly, hurled him backward.

He sprawled again on the metal deck. It was quivering, now, to the thrumming beneath. Blue fire of brush discharges danced above the edges of the rim.

Lundoon staggered back to his feet.

He gasped for breath, felt gingerly of seared hands. The drumming underfoot was steadily louder. He blinked, stared apprehensively around him.

"What a gosh-awful jolt! Was it wired for me? Not likely. Then what? The space flier, maybe? Taking off!"

Panic gripped his heart. He reeled across the quivering deck again, to the rim. Another crushing shock hurled him back.

TRAPPED, in a wall of electric fire, on a ship taking off for Mars! Stark terror galvanized him. The parachute! Its silk would insulate a road to safety. He caught up the white folds in his arms, ran to the weirdly glowing wall, flung them over it. Blue sparks crackled explosively. Flame burst from the silk. The reporter struck at it with bare hands. Another shock flung him back to the throbbing deck.

The fall dazed him. When he opened his eyes, a light shone into them. A thick, cylindrical tower, studded with round ports, had risen from the center of the deck. The light was shining from a massive door opening in its side. A man darted out.

The reporter had struggled to his feet when the stranger reached his side, gasping:

"Come on, below! Before you're killed—"

They stumbled together back into the conning tower. Heavy double doors slid shut behind them. The circular interior of the tower was crowded with unfamiliar glittering instruments. Panting, the stranger touched some control, and a humming mechanism lowered them into the hub of the wheel.

Kerry Lundoon stared bewilderedly at his rescuer. This was a tall, thin man, whose thick shaggy hair seemed prematurely white, for his skin looked ruddy and youthful. His face was lean and haggard. His blue eyes were hollow, shadowed like wells of secret agony.

"I—" floundered the reporter. "Who—"

"I don't know what you were doing out there," said the other. "But the reversal field would have killed you in two minutes more."

Lundoon got his breath and tried to be coherent.

"I'm a newspaperman," he offered. "I was looking for Dr. Winship, for an interview about his discoveries."

A brief, quizzical smile lit that strangely haggard face.

"I'm Dr. Winship," the thin man said. "And there will be time for all the interviews you like, before we get back."

"Get back?" echoed Lundoon, with increased alarm. "We aren't going—" he had to gulp— "going—to Mars?"

"No," said the thin man.

"Then where?" Panic seized the reporter. "Stop it!" His voice was almost a scream. "You've got to let me off."

Winship gravely shook his white head and glanced at a bank of quivering gauges.

"Sorry, Mr. Reporter," he said. "But it's too late to stop." That oddly whimsical smile touched his thin lips again. "You came for news? Well, this trip will make plenty of it."

"Where?" Desperate urgency screamed in Lundoon's voice. "Where are we going?"

Winship inspected his dials again, cocked his white head to listen expertly to the throbbing machinery. He nodded at last, turned back to Lundoon.

"There'll be an hour or so," he said, "while the field is building up. After all, we're in it together, and alone. I may as well tell you." The bright hollow eyes glittered at Lundoon, excited, feverish. "The *Phantom Queen* is bound for another Universe!"

CHAPTER II

The Inverse Universe

THE lean, haggard scientist opened the double sliding doors through which they had entered the conning tower. Now, since the tower had been lowered again, it gave into the interior of the great wheel, a circular space filled with huge, unfamiliar, throbbing machinery. Living quarters were par-

titioned off. Winship peered out anxiously at the immense machines.

Uneasily, Lundoon was pondering what the other had said. His mind reeled from incredulous questions. And a terrible loneliness began to haunt him, for obviously they were alone. But Winship looked at him again, with a grave understanding.

"It's strange, I know," he said. "I'll tell you about it."

The newshawk nodded gratefully.

"Dr. Cedric Kallent was the greatest scientist the world has seen," began the thin man. "You are familiar with many of his discoveries. But not with the greatest of all: the inverse Universe."

A humble awe came into his solemn voice.

"That is the supreme achievement of the human mind. But it has the simplicity of all great things. I can give you an idea of it in a few words." His keen eyes shot Lundoon a questioning look. "Of course you understand the atomic theory?"

"Of course," agreed the newshound, confidently.

"The orthodox theories of the atom recognize six subatomic particles," Winship said. "Three heavy ones: the negatron, proton, and neutron. Three light ones: the electron, positron, and neutrino.

"An ordinary atom—an atom of our positive Universe—consists of a nucleus of protons and binding electrons whose net positive charge is balanced by a number of orbital electrons.

"Kallent's geodesics of inversion established the mathematical basis for a Universe whose atoms would consist of a nucleus of negatrons and binding positrons, whose net negative charge would be balanced by orbital positrons.

"In other words, *minus* elements! A complete series, from minus hydrogen to minus uranium, with atomic numbers and chemical properties determined by the number of orbital positrons.

"And they make up a minus Universe! For Kallent's geodesics proved that the world lines of a positive and a negative atom, due to their inverse space-warp, can never intersect.

"Experiment soon confirmed mathematics. And it became Dr. Kallent's burning ambition to enter and explore that sister Universe."

Roger Winship paused to inspect the gauges, make careful adjustments on his elaborate banks of controls. Outside the tower, the mighty thrumming surged deeper again. Lundoon clenched his two hands, and fought the screaming panic in him. Trapped with a madman! Plunging into a foreign Universe! He bit his lip, waited. At last Winship went on.

"Dr. Kallent had a daughter. Her name was Venice. She and I were classmates at Tech—she had some of her father's genius. I came back with her, after graduation, to share the great research.

"SHE was a tall girl, proud and erect as a princess. She had a small, perfect face, fair skin, fine blue eyes, and honey-colored hair. Her quick smile had all the understanding humor in the world. I loved her from the moment I saw her. She liked me, but her father's work came first.

"For three years, we worked to open the door to that other Universe. The geodesics were the key. Finally we hit on the theoretical solution: a special field, of terrific intensity, whose space-warp would make positive atoms unstable, at last disrupt them, causing their energy to seek a new equilibrium in the negative form.

"The machine we built was disc-shaped, like this, with the atomic-powered field coils in the rim, although smaller and less powerful. We had it almost finished, when Dr. Kallent unexpectedly sent me to Europe to have a piece of equipment made.

"A cable from him was waiting at the hotel in Paris. It ran: 'Roger, forgive my fraud. Risk too great for all. We are going today. If anything happens, do what you can. Venice will go. She says good-by.'

"That same day I read in the newspapers that Dr. Kallent and his daughter had been killed in a terrific laboratory explosion. I was heartbroken. But I returned at once, and tried to find out what had happened. The laboratory was completely wrecked. Some

imperfection of the field, I thought, must merely have disrupted the atoms, instead of transforming them.

"Working side by side with Kallent for three years, I had learned a good deal about his unpublished discoveries. Now, hoping it would help me forget, I set out to complete his work and record it for the benefit of science.

"I was having the laboratory rebuilt, when an obsession began to haunt me: the belief that Venice Kallent, somehow, was still alive! I had peculiar dreams, in which I saw her beckoning, gesturing. Her lovely face was white, strained. She was lost and helpless, trying to communicate with me.

"Dr. Kallent had done some work, years before, t o w a r d identifying thought as a radiogen phenomenon, a subatomic radiation. Following that clue, in a direction that somehow came to me in those dreams, I made the psychode."

The thin man paused again, in that small drumming space, took down a queer-looking helmet from the wall, and fitted it to his white head. A great horseshoe tube arched above the crown, its electrodes against his temples. Golden flame burned through it when he touched a knob.

"It picks up thought-energy," he explained, "amplifies it regeneratively, heterodyned upon ultra-waves, and rebroadcasts it, thus serving as both receiver and transmitter for tele-mental communication."

A strange, burning eagerness in their hollow depths, his tortured eyes peered far beyond Kerry Lundoon, beyond the walls of the metal tower.

"I put it on the day it was done," he said, "and waited." His low voice sank, until the newshound leaned forward to hear. "The white vision of Venice Kallent came to me again. And I was able, for the first time, to understand her."

THE scientist paused a moment, reminiscent.

"'Dear Roger,' she was calling to me," he resumed, "'can you hear? I'm alive, lost in the other Universe. Father was killed. I'm all alone. It's so terrible. So strange! Can you hear me, Roger? Will you come?'

"'Yes, Venice!' I shouted, in the empty dark laboratory. 'I hear you. I'll come—if I can!'

"I thought she smiled. Then her shadow was gone."

His thin hands trembling, Roger Winship replaced the helmet on the wall. His feverish eyes inspected the dials again, peered out at the mighty drumming machines already hurling them into ominous enigma.

"That day," he said, "I began the effort to duplicate all Dr. Kallent's work, so that I could reach the inverse Universe to rescue the woman I loved. The difficulties were tremendous. The geodesics of inversion—the greatest single triumph of the human mind—I had memorized. But terrific problems rose in their application, and in avoiding the error that had caused the first disaster.

"A few times, briefly, I spoke to Venice again. She tried, fearfully, to tell me of some other being she had encountered. But she knew no more of her father's work than I. She couldn't help.

"There was a financial problem, too. Millions were needed, and I was penniless. Kallent had made me his heir. He left no money, but I was able to work out profitable applications of his brilliant discoveries. I struggled with one obstacle and another, and the years went by."

Roger Winship sighed wearily. A worn man, with the lines of agony on his emaciated cheeks. His tortured, restless eyes scanned the dials again.

"A long battle," he whispered. "But at last the *Phantom Queen* was done, ready for the voyage of rescue. Loyal men had worked beside me, for years. But they all had ties, obligations, or fears. I started tonight, alone. There was a noise on the deck." The glittering eyes dwelt upon Kerry Lundoon. "And I found you, a stowaway."

Staring, trembling, the reporter opened his dry mouth, swallowed twice. At last he could speak:

"And we're already—going—"

Eyes on the dials, Roger Winship nodded gravely.

"The atomic generators are feeding nine million kilowatts into the coils,"

he said. "The reversal field has already reached six billion kallent-volts. A little more—I don't know how much—and we shall undergo the atomic inversion, into the negative Universe. Or else, if I have failed, we shall be destroyed in a stupendous explosion of atomic energy."

"If—" whispered Lundoon. "If we live, what then?"

"If we are still alive," the haggard man said, "we shall search for Venice Kallent. The psychode, I hope, will guide us to her. And the reversal coils, at a different frequency, generate an unidirectional field that serves for propulsion in space."

SURGING up against the barrier of Lundoon's fear came a quick tide of sympathy for this slight man who had struggled so long toward a goal so difficult. He offered his hand.

"Here's hoping, Doc," he said, "that you find her."

Then his newspaper instincts were suddenly awake. What a story! He was fumbling for notebook and pencil, thinking sadly of his lost camera, when Winship's cry came to him, sharp and urgent: "Lie down!"

Lundoon flung himself to the floor of the conning tower. He was suddenly aware of a terrific strain that racked every atom of his body. There was a sudden appalling darkness, soon rent with searing flame. Every nerve shrieked with agony. For every atom, literally, was being torn asunder. The ship lurched and spun, as if swept before a black tidal wave.

Then it was ended. The pain receded. A soft little cry sobbed from the lips of Kerry Lundoon. He dragged himself to his feet, wiped cold sweat from his face.

Roger Winship was white and swaying, but a quiet light of victory shone in his hollow eyes. He touched a key, and the mighty thrum of the generators was suddenly silenced.

"It is done!" he whispered shakenly. "Field potential zero. We have been revibrated safely into the minus Universe." His trembling hand reached for the psychode helmet. "Now—Venice—"

CHAPTER III

The Giant of Cubes

HUMMING motors were lifting the conning tower again, through the circular deck. Kerry Lundoon clung to a handrail, speechless, staring incredulously through a port.

For the high-fenced field was gone. He looked into a void of velvet darkness. The darkness was laced with an incredible web of shining rays. Strange worlds shimmering like jewels of a thousand colors were strung upon those threads of living light.

"The world is gone," he whispered. "Everything—gone."

Roger Winship reeled bewilderedly to a thick-barreled telescope. He kept his eyes against its oculars for a long time. His face became lax and white with dread. Lundoon's apprehensive curiosity became ungovernable.

"What—what do you see?" he stammered.

"I don't understand it," came the scientist's dismayed whisper. "Nothing bright enough to be a sun, yet all these bodies are luminous. There were no planetary systems, but queer worlds strung on shining rays."

"What can we do?" demanded the reporter. "Can we—can we go back?"

Roger Winship's thin face was stern with purpose.

"We'll search for Venice," he said. "She's here—somewhere in this madness—alone."

He adjusted the golden horseshoe of the psychode helmet on his head, and stood rigid beside the telescope. His eyes closed. It was eerily and ominously still.

Waiting, in a maddening tensity of anxiety, Lundoon peered outside again. Below and above, this strange space was the same. A lace of light woven against the darkness, sewn with tiny jewels of worlds.

He put his eyes to the telescope, and trembled to the strangeness of another discovery. These were no natural planets! One was an opal globe; but another was a white cube, the third an

emerald tetrahedron, the fourth an amber rod.

A great disc of flaming magenta came across the field: a fiery wheel rolling on a ribbon of purple light. It receded and vanished. A bright green ellipsoid came back, devouring the purple road as it came. It passed, huge for a moment as the Moon, and also vanished.

What manner of Universe was this?

Staggering back from the instrument, the reporter passed a trembling hand across his forehead. Here was evidence of order, of law. But what uncanny order? What incredible law?

Roger Winship, beneath the psychode's fantastic crown, uttered a low gasping cry. Hastily, he took the thing from his head. His face looked white, stricken.

"Venice?" whispered Lundoon. "Did she speak?"

"No," said the thin man, his face still shadowed with some unutterable dread. "But a strange mind reached me. It commands us to land upon the nearest planet."

"But you won't obey!" protested Lundoon, apprehensively. "You don't know what sort of being—it may be dangerous."

"But I shall obey," said Winship. "It is the only clue."

He touched the control board. The generators started again, their throb now more gentle than upon the interuniversal voyage. The opal sphere drifted nearer.

IT was a strange ball of luminescence, perfect, many-hued. It was splendid against the velvet dark. No fewer than six incandescent threads, ranging in color from frozen blue to a dull smoky crimson, joined it to the web of worlds.

"Queer!" Winship was at the telescope again. "A perfect globe, two thousand miles in diameter. No trace of atmosphere. No mountains, no seas. Nothing like a city—no sign whatever of life or intelligence. Just a bare, shining ball."

"What—what could it have been," the reporter said huskily, "that spoke to you?"

"We shall see."

The *Phantom Queen* proved swifter than Lundoon had thought possible. The strange world ahead grew. It was like a vast bubble of frosty incandescence, expanding.

Winship touched his keys again. The drum of the generators softened. The disc tilted, so that the planet was beneath. It dropped, toward a brilliant convex horizon.

Softly, they landed. The dark sky above was veiled with wondrous woven rays. A hard flat plain shimmered away from the ship. It was absolutely featureless, nowhere broken. A thin strand of blinding green fire leaped up beyond the flat horizon, ran straight to a tiny, cone-shaped world of red.

With a trembling hand, Winship was pointing out at that level of mingled diamond light.

"Look!" he quavered. "It's crystalline—in the cubic system!"

Peering down at the plain, as near the ship as he could, Lundoon saw that it was all composed of tiny, identical cubes, carefully laid to form a tilelike surface.

"That's so, but—"

His throat stuck. For the shimmering plain had heaved up. As if hurled by an explosive blast, a cloud of little diamond blocks came flying toward the ship. They rained down upon the flat circular deck, outside the conning tower. And they fell in a very curious way.

Lundoon had seen that each one-inch cube was joined to eight of its fellows by tiny threads of incandescence that ran from corner to corner. And they didn't fall at random on the deck, but piled themselves into a grotesque mockery of the human form.

It looked like something a child might have built, with a million nursery blocks.

It towered twenty feet tall. It was weirdly terrible.

One stride brought it to the observation tower. The ship shuddered to its weight. A thin rope of bright yellow fire ran from it back over the rail to the hole it had left in the plain, joining these cubes to the others there.

The face of it was outside the ports.

The reporter stared at it with a sick fascination. Hard bright cubes, strung together with threads of fire, made a massive nose, bulging many-faceted eyes, the square travesty of a chin. The thing looked like the creation of a surrealist sculptor gone mad. And it was infinitely horrible.

A fantastic arm of cubes came up, made some incomprehensible gesture.

"It's alive!" sobbed Kerry Lundoon. "The whole planet is alive!"

ROGER WINSHIP looked at him for a moment, with a torture of uncertainty in his hollow blue eyes. Then, slowly, he began to put on the headset of the psychode.

"I think it wants to talk to us," he said.

He seemed to listen. His thin face went suddenly white. Beads of sweat burst out, and gathered into glistening droplets that rolled down his lined cheeks.

"No," he whispered. "I won't do it! I want to find Venice. I want her more than anything. But I won't do that."

In a fever of apprehension, Lundoon caught his arm.

"What is it?" he demanded. "What does it want?"

But the scientist, absorbed in his battle with the grotesquerie of cubes, paid him no heed. And Kerry Lundoon turned suddenly to the ports again.

For that nightmare giant had stepped back across the deck. A second eruption of cubes opened a greater hole in the plain behind it. These, also, rained upon the deck. But they changed as they fell.

Bars of yellow gold laid themselves in glittering stacks. Massive ingots piled themselves, gleaming with the blue white of platinum, the blue gray of osmium, the brilliant white of pure radium. Great blocks fell into walls, flashing with the green of emerald, hot scarlet of rubies, prismatic splendor of diamonds.

That precious, incredible rain continued until the ship was laden with treasure beyond all calculation. And Roger Winship stood motionless inside the conning tower, the golden horseshoe still burning on his head, mute agony twisting his thin face.

"Millions!" gasped the reporter. "That's worth—billions! If it's real."

Still the scientist seemed not to hear him. The dull voice spoke again, gray, weary:

"No, I won't do it. All this is less to me than Venice. But I won't do it, even for her. I tell you—I won't—"

His voice had risen almost to a scream. Suddenly Winship wrenched the helmet off, dropped trembling on the stool behind the control board. Lundoon gripped his shoulder.

"What did it want?" he asked in a voice hoarse with urgency.

Dull and bloodshot, unutterably weary, Winship's hollow eyes looked up at his face.

"It wanted me to reveal the inversion geodesics," his dull voice said. "Dr. Kallent's greatest discovery: the key to the gate between the Universes."

"Why?"

Cold dread had already stiffened the journalist, when Winship spoke.

"There could be but one reason: that it desires to invade our own Universe. Therefore, I refused. It offered me all the treasure stacked outside, transmuted out of its own substance. It offered to lead me to Venice, and surrender her to me safe and alive." His voice was hoarse with pain. "But still I refused."

"Now what?" Lundoon demanded apprehensively. "Can we go back?"

Winship shook his white head.

"I don't think so. We're in its power. There would be no time to build up the reversal field. Besides, I am afraid to try. It can't discover the geodesics from any examination of the ship. But it might read them from my mind, if we tried to return—and follow."

The reporter's tongue stuck to the roof of his mouth.

"What—" he faltered. "What is going to happen?"

Winship shrugged thin shoulders, hopelessly.

"We'll be killed, I suppose. Probably not very pleasantly. The thing threatened to destroy us if I didn't reveal the geodesics. There's nothing

we can do."

The haggard head sank forward on his arms.

Kerry Lundoon turned unsteadily again to the ports. The precious stacks of metal and gems still lay on the deck, with that fantastic giant behind it. But something was happening to the treasure. A rope of white fire had run to it from the pit in the plain. At the ends of raveled incandescent threads, metal ingots and crystal blocks were flowing—changing back to hard bright cubes.

And the change didn't stop with the treasure. Bright filaments stabbed against the steel of the ship. Glowing knots formed at their ends, grew swiftly into cubes like the rest. The metal was pitted, consumed.

"It's eating the ship!" Roger Winship gasped. "We've got to get away."

A dull weariness still in him, the scientist stirred himself heavily, tapped at the control keys. The machinery throbbed again. The *Phantom Queen* lifted from that bright plain, into a flame-veiled space.

But the cloud of new-born cubes rose about them. The joining strands of fire stretched endlessly. And still the consuming threads attacked the ship. Winship dropped his white head again, hopelessly.

"We are helpless," he whispered. "There is nothing we can do."

CHAPTER IV

Mock-Sun

KERRY LUNDOON turned away, shuddering, from the swift, uncanny destruction of the deck. Frantically, his eye searched the conning tower, fell upon the psychode helmet, which Winship had thrown aside after his failure to communicate with Venice Kallent.

With trembling hands the reporter set it on his head, snapped on the switch to light the horseshoe tube. He felt a curious tingling shock from the cold metal electrodes against his temples.

"Help!" he began to shout. "Help, before we die!"

Suddenly, then, crawling images of uttermost malevolence filled his mind. Somehow they were rendered into words, perhaps by his own mind, as if a mocking, evil voice were saying:

"No one will help you, little being. For you two are alone. You know not the secret, and the other will not speak. Therefore you both must perish—uness you will cause the other to reveal the inversion geodesics."

That was the way out, Lundoon perceived. Attack Winship, beat him, torture him, force him to reveal the secret. He was amazed at the sudden, virulent hatred that filled him. Winship was a murderer, he was about to kill them both. And this being of the cubes was merely strange, not really evil.

Lundoon knew, somehow, that he was snatching a pair of heavy binoculars from beside a port. He swung them over the bowed white head. Knock him out, that was it. Bind him. Then twist his fingers. Burn his toes. Make him tell—

"Wait!"

Another strange voice seemed to speak through the helmet. It was like the peal of a silver bugle, clear, imperative.

"Wait! For I am coming."

And the thin man looked up, startled. He ducked the blow. His white head butted into Lundoon's middle. The reporter struck again, savagely. Get him! The first voice overwhelmed the other. Make him tell!

Winship's groping hand caught the helmet, jerked it from the reporter's head. Kerry Lundoon staggered back against the wall, suddenly weak and faint with the horror of what he had tried to do.

"Sorry, Doc!" he gasped. "Somehow—it got me!"

The pale, haggard face smiled at him, wanly.

"I understand, Lundoon. I met it, awhile ago." Breathing hard, he sat wearily back on the stool. Fingers fumbled automatically in his pocket. "Smoke?"

Lundoon accepted and lit a cigar. Then he remembered something.

"There was another voice. Something else—coming!"

He looked outside again. Still bright cubes swarmed above the deck, still thrust their filaments against the heavy steel, transforming it to other cubes.

But suddenly the light of the terrible swarm grew dim. Bright threads snapped. The cubes swept away from the ship like a flock of frightened birds. And another thing darted down, hung poised outside the conning tower.

No larger than a man's head, it was a mirror-polished globe. Its surface reflected in miniature the strange veil of fire across the sky. It tapped gently against a port, as if seeking entry.

WINSHIP, beside him, was staring at the sphere.

"It's all right, Doc," Lundoon assured him. "It drove away the cubes."

Winship put on the psychode. The tube flamed golden again. His haggard face smiled. And Lundoon listened once more to half a strange conversation.

"Yes," said Winship, "the thing of cubes is our enemy. . . . We came to this Universe to seek one of our own kind." . . . His voice went hoarse with amazement. "Yes, Venice Kallent! You know *her?* . . . Energy? . . . Yes, we have energy to spare. I'll let you through the lock."

His white face turned to Lundoon.

"It knows Venice," he whispered. "It says that it has escaped from a prison in which they were together."

The silver globe had vanished from the port. Winship touched the buttons which controlled the double, sliding doors. The inner one opened, and the sphere flitted into the conning tower, quick and silent as the image of a trembling mirror.

And Kerry Lundoon, standing near the yellow horseshoe of the psychode, was aware of faint thought-images, eagerly hopeful.

"Energy? Energy for me?"

"Plenty of it," Winship said. "Millions of kilowatts, from the atomic generators. But tell me about Venice."

Unconsciously, Lundoon had become aware that his cigar was extinct. Automatically, for all his mind was filled with the wonder of that argent bubble, he thumbed a pocket lighter, raised it. He was astounded when the bubble leaped like a moth at the tiny flame. It hovered above the light, and suddenly its silvery film was hidden in a mist of rainbow color.

"A splendid thing!" came Winship's awed whisper. "A perfect parhelion."

Parhelion? The reporter puzzled at the word, recalled that it meant a mock sun, a sun-dog. Faintly, then, the thought-forms of the little being:

"Energy is good. Mock-sun is grateful. For he was starved for energy, in the prison."

"Welcome, Mock-sun!" Winship said eagerly. "But where is Venice? Tell me about her."

Lundoon could catch nothing more of the swift emanation of thought from the sphere. Rapt wonder had seized Winship's pallid face. His hushed voice asked swift questions.

"Where is the prison? What is this thing of cubes? Can we fight it?"

Lundoon waited in a fever of impatience.

"What is it?" he demanded once. "What does it say?"

But Winship seemed unconscious of him. The sphere still danced in its haze of color above the lighter's flame. It seemed a long time before it turned silver again, darted upward. Winship bent suddenly over the controls, and the *Phantom Queen* throbbed into motion again.

"Where are we going?" Lundoon questioned. "What did it tell you?"

"A great deal," said Winship's awed voice. "An amazing story." He adjusted the controls. The generators drummed louder. The far-off web of colored rays crept visibly past the ports.

IMPATIENTLY, Lundoon insisted, "Tell me!"

"This Universe was once pretty much the counterpart of our own, so I gather," Winship began. "Its matter condensed into galaxies, suns, and planets. Life was born, became intelligent, extended its sway over matter. Upon one planet sprang up a race of

scientists. Two of them, brothers, became the supreme minds of this Universe.

"Grappling with the few great problems their race had not solved, they first sought eternal life. One of them —our guest, who had conveniently elected the name Mock-sun,—achieved the goal through a mastery of space and time.

"His brother being sought it in another way, through control of energy and matter. It revised its entire physical organization, and gradually made itself able to transmute and assimilate matter in unlimited amounts.

"It devoured all the others of its race, save Mock-sun. It devoured all the life on the planet. Then it transmuted and consumed the material of the very world itself. It stretched out the radiant tubes of force that might be called its nerves to other planets, even to their parent star, and transformed them also into the hard eternal cubes of fixed material energy that were its life-cells.

"Its greed was insatiable. It spread from star to star, across all the galaxy. It consumed everything it touched, from suns to meteoric dust. It reached a shining arm to the next galaxy, spread to others.

"In the end, all the matter in this Universe-continuum had been consumed—all save the body of its brother being. It attacked him, also. But Mock-sun protected himself. He created this silvery shield—walling himself, in fact, into a tiny sub-space manifold of his own.

"Mass is not always indicative of quality. The conquering entity suspected the existence of our twin Universe—and desired, in its infinite greed, to enter and devour it. But, for all its giant bulk, it was unable to discover the geodesics of inversion.

"The keener mind of Mock-sun had long since mastered them. However, recognizing the infinite evil of the other, he refused to reveal them. Demanding them, the other confined him, cut off the energy he needed to live.

"Venice, when the experiment hurled her into this Universe, fifteen years ago, was thrown into the same prison—still aboard the ship, but unabe to operate it. They have been together.

"The psychode made them aware of our arrival. Mock-sun escaped—he has some power left, against the other. And he came to guide us to Venice."

Suddenly the silver bubble was darting, as if with alarm, from port to port. Looking out, apprehensively, Kerry Lundoon saw an ominous thing. The shining web that veiled the dark sky was tightening, the queer living worlds drawing in about them.

"It's closing in!" he gasped.

Hastily, Winship adjusted the psychode again. Intent with listening, his face went ashen white.

"Mock-sun says that the infinite entity has discovered his escape," he whispered in dismay, "and terminated a sort of truce they had made. Now all its power is against us."

CHAPTER V

Universe Lost

ROGER WINSHIP'S drawn hollow face showed no fear. An eagerness of hope was burning in his feverish eyes.

"It has been fifteen years." His low voice was anxious and wistful. "If I could only see her again, before the finish, I should ask for nothing more—"

Kerry Lundoon was peering out, fearfully.

A scene of terrible wonder met his gaze. Burning against velvet dark, bound together with cords of flame, strange worlds were crowding thick about them. Various as to shape and color, fantastic as a madman's dream.

A rope of hot red fire leaped at them suddenly, like a striking snake, from the center of a violet planetary ring. The end of it raveled out, into a million wirelike strands. These incandescent filaments shot to the deck. Bright cubes grew swiftly at their extremities, and the metal wasted again.

The reporter turned suddenly from it. He caught the silver bubble be-

tween his two hands. He chatted fearfully.

"Can you—can you help us?"

But Winship, with the helmet on his head, said hopelessly:

"We are lost. Mock-sun cannot use the power that he has. He can't, now, even guide us to Venice. And there—*the air!*"

Lundoon looked out again, in time to see a black hole yawn in the pitted deck. Outrushing air condensed into a tenuous cloud of frost. And the frost was gathered into a glittering cube; nothing escaped the hunger of the universal being.

Rigid with the terror of death, the reporter saw a bright filament stab against the port. He saw the thick quartz transformed into little hard cubes, bright with opalescent gleams. And then the port was open.

The air exploded outward. Lundoon was hurled against the wall. Breath sighed out of his bursting lungs. Agony swelled his heart. The hammer of his pulse was deafening. He felt the hot rush of blood in his nostrils, his ears, tasted its salty sweetness in his mouth.

Pressed from their sockets by fiendish fingers, his eyes went blind. Terrible fingers closed on his throat. His empty lungs labored in vain. He staggered, fell.

And, in that last terrible moment, he thought he felt incandescent filaments burning against his body—to transform it also into hard tiny cubes.

But awareness came back to him, out of a queer dream in which he was winged, soaring above the towers of New York. He could breathe again. He opened his aching eyes, and discovered Winship near him, and the silver globe of Mock-sun.

They were all floating together in a queer transparent bubble. The wreckage of the *Phantom Queen* was a little distance away. Lundoon watched its last fragment dissolve into a little swarm of bright cubes, laced together with shining wires. The strange worlds, beyond, still were gathering.

Winship, the psychode still on his head, floated up from the bottom of the twelve-foot crystal bubble.

"What—" gasped the reporter. "How—"

"Mock-sun was able to use his power, after all," the thin man said. "He made this transparent shield—it is akin to his own sub-space barrier. He filled it with oxygen, so that we can breathe. The cubes cannot enter it. And he can move it, so that we can continue the search for Venice."

EVEN as Winship spoke, the bubble darted away, at a speed far greater than the *Phantom Queen* had attained. The bright living web was brushed backward. They plunged into a gulf of darkness, so vast that the clustered worlds were lost.

"The prison," Winship rendered Mock-sun's message. "A space drained of all energy."

The bubble came, at last, to a sudden halt.

Roger Winship pointed abruptly out through its pellucid film, uttering a soft, choked cry. Staring, Lundoon saw, drifting beside them, a battered disc of steel, a smaller *Phantom Queen*.

"That's Kallent's first machine!" sobbed Winship. "Where Venice is!"

The reporter saw a woman's face looking through the round port of an air lock in the rim. A thin face, pale and anguished, its violet eyes were wells of tortured loneliness. Horror unspeakable had marked it. Yet, somehow, it was still beautiful.

"Venice!" Winship was shouting. "Venice—darling!"

The woman beckoned. The bubble floated closer to the valve. She vanished, flung it open. Escaping air hurled her out. She struck the shimmering wall. And, somehow, it let her in.

A throbbing ache closed Lundoon's throat, to watch that reunion. Roger Winship caught the exile's frail hands, with both of his. They stared for a moment at each other, on both their faces a startled, half-incredulous wonder.

"Roger!" whispered the woman. "You came!"

She burst suddenly into tears. Winship made a little choked sound, and

drew her very tenderly toward him. And abruptly they clung together, desperately.

Then the little silver ball of Mock-sun was suddenly darting about the bubble. It bumped gently against Winship's head. He turned from the woman, to adjust the psychode.

"Followed?" the scientist gasped.

Indeed, far off in the black gulf, the reporter saw a cometlike body. A bright spark, racing toward them, trailing a path of flame. Lundoon was still staring, fearfully, when Winship touched his arm.

"Get your breath," he said. "We're going back."

"Back?" Lundoon was incredulous. "Back to Earth? How?"

"Mock-sun has mastered the geodesics," Winship said. "And we are still so far away that he can shield the process from the enemy."

"When?" Lundoon gasped.

But Winship had already made a warning gesture. And the reporter was overwhelmed again with racking torture, as if every atom of his body were crushed by inconceivable forces. The agony of the reversal field. It ended. And he was amazed to find himself sprawled on the ground.

He staggered to his feet, bewildered. The sky was blue above. The genial rays of a familiar sun fell across clumps of green trees and great, white-walled buildings. Fresh-mowed grass was crisp underfoot. The warm air shuddered to the distant mundane whistle of a locomotive.

This was Earth again.

Home!

THEY were back in the well-fenced grounds of the Kallent Memorial Foundation, he recognized, from which the *Phantom Queen* had carried them. Roger Winship was helping Venice to her feet, at his side. Mock-sun was bounding about over the grass, like a silver ball.

"We're home!" sighed the weary man, happily. "After fifteen years! Venice, my darling—*ugh!*"

Lundoon heard the sudden croak of horror in Winship's voice. He turned. Consternation froze him. For the thin, white-headed scientist was retreating from the woman he had rescued. His hands were lifted, his gaunt face ashen and rigid with dread.

The woman had laughed, mockingly. The laughter changed to a sound not human. Her slim body altered suddenly. It became a fantastic grotesquerie of hard, bright cubes.

"Venice!" Winship gasped. "Why, Venice—"

Beyond them, the silver globe of Mock-sun had dissolved into a cluster of glittering cubes. Already they were feeding on the grass. Bright filaments writhed from their corners down against the turf, absorbed it to grow new cubes.

The fantastic thing that had been Venice Kallent dissolved into a swarm of little opalescent blocks, that fell like locusts on the trees and grass.

Roger Winship staggered back against the bole of a tree, wiping horror-sweat from his gray, stricken face.

"What a fool!" he whispered. "What a fool I was!"

"What—" Lundoon gasped. "What—happened?"

"A trick," came Winship's rasping voice. "It was all a hoax, designed to destroy our Universe. In the attack on the *Phantom Queen*, when we were unconscious, the entity recaptured Mock-sun."

"But Mock-sun helped us—"

"The thing that helped us, or pretended to, was a counterfeit Mock-sun, made to deceive us. It was easy for the entity has absolute mastery of matter. The counterfeit led us, not to Venice, but to another duplication. And so, unwittingly, we brought back the seed of the monster, to destroy our Universe!"

CHAPTER VI

Infinite Illusion

THE change which overwhelmed the world took place with a frightful and progressively increasing rapidity. Each cubic life-cell of the invader, when grown, could send out seven new filaments, from seven

corners, to start new ones.

The grass and trees within the high-fenced enclosure were soon transformed to gleaming blocks. The white buildings fell, and then the fence. Trees and stacks in the distance crumbled. Inequalities were leveled. The earth, to the limit of vision, was soon a glittering opalescent pave.

The workmen and technicians employed by the Foundation, with their families, had lived in a model community village which occupied one end of the thousand acres. The fate of those neat homes was a scene of typical horror. Screaming men, hysterical women, wailing children, all fled vainly from the terror of the cubes.

Overtaken, struck ruthlessly down by conglomerate hammers, they were swiftly turned to bright cubes themselves—and so rose to pursue the rest.

Lundoon had momentarily expected the death of Winship and himself. Surely their lives had no value to the entity. And, since Earth was lost, their fate seemed to matter not at all.

But they were spared. The turf was consumed beneath their feet. A shrieking mechanic, running toward them, fell and was consumed almost at their feet. But they were left at the end, standing alone on a glistening plain of diamond blocks.

The world was flat, presently, to the level horizon. Nothing broke the glittering surface. And Lundoon saw a rope of purple flame leap out across the westward sky, toward the waning moon. He watched its mottled silver change to a poison green. He saw other fiery shafts arrow from it, to consume yet other worlds.

"It is done," he whispered. "But were we spared?"

He looked at Roger Winship, haggard disheveled man, sunk in weary heart-crushed apathy. The scientist shook his white head, fantastic with the psychode still upon it. He made no reply.

Lundoon gripped his arm in sudden panic.

For the shining plain had heaved up before them. A rising cloud of cubes left a ragged pit. They clustered together to form, once more, a grotesque, gigantic manlike shape. It came toward them, still bound to the pit behind it. Standing before it, Winship adjusted the psychode, listened.

And Lundoon was suddenly absorbed by the expression on the face of the scientist. His despair and horror seemed to ebb away. A grim smile played for a moment across his lined features. And Winship shook his head.

The gigantic thing tramped nearer. Its great arms flailed threateningly. Colossal feet crushed down, almost catching the two men. And Roger Winship smiled again.

"Nothing doing, sweetheart," he said softly.

He slipped off the helmet, and stood idly swinging it in his hand. The bewildered reporter caught his arm.

"Now what is it?" he asked.

Roger Winship made a cheerfully careless gesture at the appalling giant.

"It informs me that Venice is still alive," he said. "Still in the ship that we saw imitated so expertly. And it will carry me back to the other Universe, to join her—if only I will disclose the inversion geodesics!

"It can do no harm to spill the geodesics, now, the entity argues, because our Universe is wiped out anyhow. And still it needs them, otherwise it is forever cut in twain. It is offering, therefore, to take us back to Venice, and to let us live out our natural lives there in the ship—if only we tell.

"If we don't, torture for both of us—until we do."

LUNDOON saw nothing to be so cheerful about. His throat was rough and dry, but finally a husky whisper came.

"Well—why not tell? If it can't hurt—"

Wearily, Roger Winship smiled.

"Mass doesn't always mean quality. Among the largest brains ever weighed was that of a congenital idiot. The entity has set a very elaborate stage and produced a very impressive illusion—but there's one obvious flaw."

"Illusion?" gasped the reporter. "Flaw?"

"It is obvious," said Roger Winship, "that we have not been returned to our

own Universe. Therefore we have not seen Earth destroyed."

"But we did—" began Lundoon.

"We thought we did. But we know that the entity is a master of matter. We have seen that its substance, at will, can be molded and transmuted into any form. More significant, we know, too, that the psychode, amplifying any thought, is a powerful adjunct to hypnotic suggestion."

Lundoon glanced fearfully up at the threatening monster of cubes.

"But this is—was the Earth," he insisted. "Mock-sun brought us back."

"That's the flaw," said Winship. "The real Mock-sun knew the inversion geodesics. But the counterfeit that returned us was a part of the entity. And the entity doesn't know them. Therefore, we weren't brought back!"

Lundoon gasped, his head spinning. When he looked up at the darkening sky, he saw that its flame-veiled wonder had indeed grown curiously familiar. This world might very well be the opal planet where they had first landed.

He peered in bewildered apprehension at the fantastic giant. That, anyhow, was real, menacing. But suddenly the little blocks that formed it turned black, and began to fall apart. They clattered down, like shattering black glass, upon the plain.

And the plain itself was darkened. A circle of blackness ran out like a ripple, from where the monster fell. It expanded to the flat horizon. A shadow was cast upon the veil of flame above. The colored sparks of worlds were quenched in darkness. A dim purple twilight fell upon them, and Lundoon shivered to the chill of universal doom.

"It must be dying!" he whispered. "But why?"

A disc of battered metal came plunging out of that void of deepening purple, slowed itself, settled softly toward them.

"Kallent's old machine!" cried Winship. "Or else the counterpart we saw!"

It landed beside them on the glassy, darkened plain. A valve opened in its rim. A familiar small globe of silver darted out, tapped against the helmet swinging from Winship's hand. He put it on, lit the golden horseshoe, listened.

"If you are Mock-sun," he said, "repeat the inversion geodesics. . . . Good! And where is Venice? . . . What has happened to the entity?"

Consumed with wonder, the reporter studied Winship's lean face. It went lax with amazement. It was suddenly bright with eagerness, then clouded with sorrow. Tears welled out of the weary eyes, ran down hollow cheeks.

THE purple dusk, meantime, grew deeper. As if, Lundoon thought, all light was being quenched from this Universe. He shivered to an increasing chill. The air seemed very thin; his lungs were laboring.

And something, he thought, was the matter with Mock-sun. Little irregular patches of darkness appeared and vanished on its bright silver. At last it sank, as if weary, upon the black pave.

Winship slowly looked away, toward the machine. Lundoon caught his arm, rapped out insistent questions.

"Yes, this is the real Mock-sun, who was in prison with Venice," he said. "He has destroyed the entity—the being that was his brother. He did it with a subtle transformation of the space-warp, so that it is no longer an adequate medium for the other's vital energy.

"Mock-sun had possessed the weapon for a long time. But they were brothers, alone together. Mock-sun, in a way that perhaps we can never understand, loved the other. He forgave it all its crimes—even his own imprisonment and torture.

"Mock-sun was near death, he says, when Venice was thrown into the same prison. She kept him alive with the heat radiated from her own body. They were together fifteen years. Mock-sun, it seems, came to feel something more than gratitude. For it was for her sake, at last, to insure the safety of the world she loved, that he killed the other being."

In the thickening purple darkness, Winship looked down at the small globe lying at their feet. Larger

patches of black were flickering across its silver.

"It is difficult to follow the emotions of an alien being," Winship said. "But Mock-sun is ill—perishing. Not from any physical necessity, I think, but because his heart is broken by what he has done."

A sharp, brittle snap drew Lundoon's eyes to his feet. The silver sphere was gone. A minute naked body quivered, where it had been, and lay still. Wonderingly, they bent over it. At first it resembled the form of a tiny man. In a moment, however, it had crumbled to a pinch of gray dust.

Presently Winship got slowly and stiffly back to his feet.

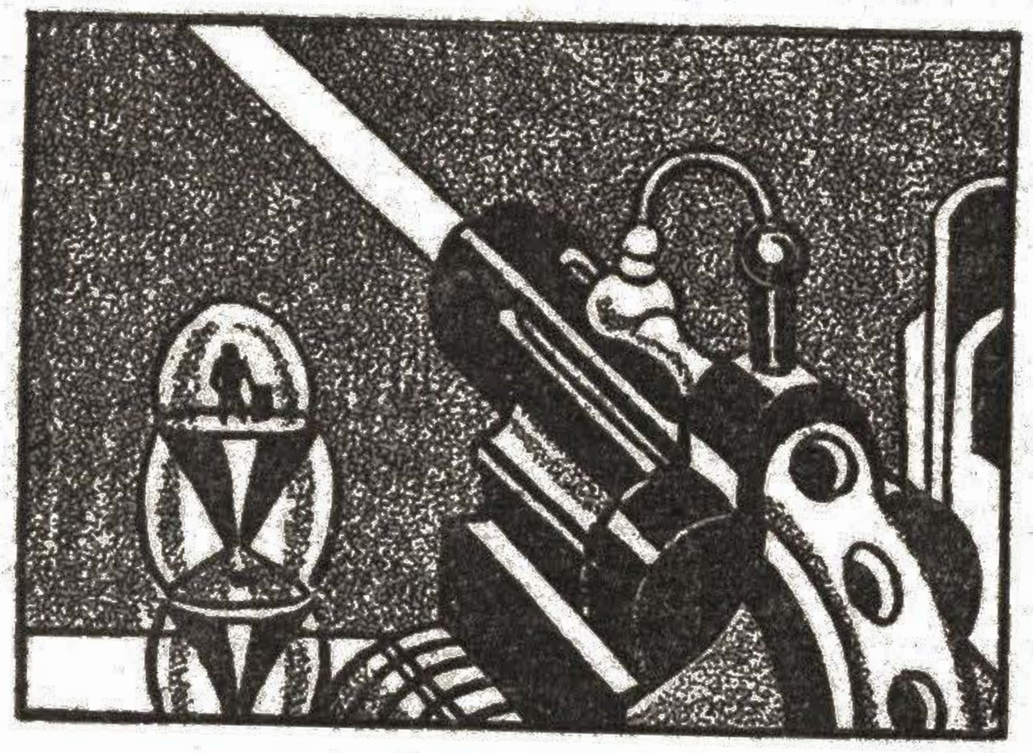
"Come aboard," he said. "The ship is uninjured. We can return to Earth."

The rusted valve closed behind them. They came through the lock, into the machine. Winship stopped, with a soft cry of breathless joy, and then ran unsteadily forward.

For a woman had been waiting for him. Swaying to meet him, she looked thin and frail. Her hair was completely white. Her violet eyes were shadowed with the horror of her long exile, but happiness was a radiant light in them now.

"Roger!" she whispered. "You have come!"

Lundoon walked softly past them, into the control room of the ship that now could take them safely back. His practiced mind was searching, already, for the fitting lead for his story that would scoop the world.



Next Issue: TERROR IN UTOPIA, a Novelette of Super-Science by PAUL ERNST

EASY MONEY

"The man is not an inhabitant of our world at all," he yelped

Slugger Martin Enters the World of Psycho-Control—and Discovers That Mind Is Mightier Than Muscle!

By EDMOND HAMILTON

Author of "Space Mirror," "Power Pit 13," etc.

IT was a dirty frame-up, that's what it was! And it was a nutty one, too—this old Doc Murtha who framed me was so nutty he tried to tell me that I'd been clean off the Earth, that I'd been on another world. Can you tie that?

Me, I'm Slugger Martin—profession, middleweight, age, thirty. Ten years ago I nearly knocked out the champion, only he knocked me out first. Well, ten years is a lifetime for a leather pusher, and that's how come on this morning I was holding down a bench in Battery Park and wondering mighty gloomy just how I was going to eat.

Then up stepped this Doc Murtha. He was a shriveled-up little cuss with a waspy look, who had been eyeing me for ten minutes. He wore an old rusty black suit and hat, and he came over to me now and fixed his beady eye on me.

"Young man," he said to me in a kind of severe voice, "how would you like a job?"

"I'd like one if there was no work

connected with it, pop," I told him, figuring he was just another busybody.

"Don't call me pop," he snapped. "I'm Doctor Francis Murtha, discoverer of the Murtha electron-wave effect."

"Never heard of it," I told him. "I'm Slugger Martin, who went nine rounds with Tiger McGinty."

"Never heard of him," the little doc snapped right back at me. "You're a pugilist, eh? That's good. I'm looking for somebody with a strong body and a dim intelligence."

"Say, listen," I said, getting up to my feet. "I know when I'm insulted. You better—"

I stopped, goggling. The little doc had shoved a century note under my nose.

"How would you like ten of these?" he asked.

I looked around uneasily before I answered.

"Okay, Doc," I said. "I'm your man. Just name the party. But no cops or frails, mind you."

"What are you talking about?" he demanded.

"About this guy you want me to bump," I said. "What's his name and address? And you'll have to give me the grand first."

"You thick-skulled l u m m o x!" roared Doc Murtha. "I don't want you to kill anybody. I simply am willing to pay you a thousand dollars if you will submit yourself to a great scientific experiment."

"The heck with you!" I cried. "You think I'm going to let you cut me open for a lousy grand?"

"No, no!" he exclaimed furiously. "You've been reading too many Sunday supplements. I'm a physicist—I've invented a method of projecting matter across vast spatial abysses, by dematerializing its atoms into vibratory force, projecting that f o r c e through extra-dimensional gulfs, and letting it materialize again at its destination. I can project matter across the whole galactic system instantaneously, and draw it back again, by retracting the undimensional revolving field—"

"Listen, Doc, are you trying to kid me?" I interrupted threateningly. "Who ever saw a field revolving?"

DOC MURTHA muttered something that sounded like a curse. He glared at me, then began again, slowly and distinctly.

"I've invented a ray," he said. "A ray that shoots things a long way and drags them back again. Can you understand that?"

"Sure I can," I said. "What do you take me for—a boob?"

He muttered something else under his breath, and then went on. "I've shot rabbits off with this ray and brought them back unhurt, proving they landed somewhere with near-terrestrial conditions. Now I want to do it with a man, who can tell me about the experience."

"Kind of a new radio that sends people, eh?" I said. "How come you picked me for the first ride on it?"

"Because if I used anybody very smart, he might steal the idea of my apparatus from me," said Doc Murtha.

That sounded to me like another crack, but I passed it up, on account I was looking hard at the bill in his hand.

"All right, Doc, I'll try it," I said. "But I want the grand before you shoot me off on this radio-ride of yours."

"You'll get it," he snapped. "My apparatus is in my Long Island home. Come along with me."

The Long Island house, when we got there, was a big, white old dump set back from the road. No one else was there, and when we went inside I saw the rooms were filled with machines and lights and racks of bottles, like a big dentist's office or something.

Doc Murtha went to a thing in the middle of one room, a flat, round copper platform setting on top of a lot of tubes and coils and junk like that. He laid his hand on it proudly.

"The Murtha field-projector," he said. "It is what will hurl you forth as dematerialized force on your great journey."

"Could you send me to Poughkeepsie on that thing?" I asked. "I know a dame there I ain't seen for a long while."

"You're going a lot farther than

Poughkeepsie, Martin," the doc said, laughing kind of strange.

He handed me ten century notes.

"All right," he then said, step up on the transmitter-disk and we'll get going."

"You mean, I'll get going," I said, staring at the machine and scratching my head. "Listen, what if you send me way off to San Francisco or somewhere and then can't get me back?"

"There's no danger of that," he snapped. "Wherever you find yourself when you rematerialize, just remain in that exact spot without moving and in five minutes I'll draw you back again."

I was kind of wishing I hadn't been so quick to agree, for this thing looked like a hot seat or something. But my motto is "try anything once," so I stepped up onto the platform. Doc Murtha dashed around, jerking levers and knobs. Motors or things like that began to hum, and there was a crackling from the tubes under my platform.

"Doc," I said uneasily, "are you sure—"

"Quiet, Martin — here you go!" he yelled.

And he turned a switch. And someone hung a hard right on my chin, or it felt like it. For I went out for the count.

When I came out of it, I was plenty mad, I want to tell you. I scrambled up, shaking my head and blinking my eyes.

"Doc, who's the son that poked me from behind?" I roared. "I'll put him in the hospital when—"

Then I stopped, my jaw hanging. You see, by then I had opened my eyes and was looking around me. And Doc Murtha wasn't there. And neither was the machine nor the house I'd been in, nor Long Island. I was standing right smack in the middle of a big city I'd never seen before!

"Holy smoke!" I gasped, looking around me. "The doc's radio has shot me off to China or some place!"

I WAS standing in a kind of little park, beside a tree. It was a queer tree with square red leaves, and there were a lot of other trees like it, and the grass was red and even the sun was red and looked bigger than usual. Around the park were silver streets, and huge metal buildings like pyramids, taller than the Empire State Building. I figured when I saw those pyramids that I must have been shot to Egypt.

People in the street had stopped to gawk at me. These Egyptians, the men and dames both, wore nothing at all but a little skirt and shirt of woven chain metal. They stared and pointed at me and then they burst out laughing. I got mad at that, and I went out in the street and grabbed one of those guys who was laughing at me.

"Where did you get those ridiculous garments?" he asked me, pointing at my clothes.

"What do you mean, ridiculous?" I cried. "Didn't you Egyptians ever see a civilized man before?"

Suddenly it struck me as kind of queer. This guy hadn't talked English, but some language of his own. I hadn't ever heard his language before, yet I could understand it and speak it!

That surprised me. But I knew a smart guy picks up things quick in a strange burg, and I realized I was smarter than I'd thought, to pick up this Egyptian language in a flash, as I'd done.

"Never have such queer garments been seen in Calthor before," choked the man I was holding, gasping with laughter.

"Rib me, will you?" I gritted. And I let him have my good old left on the chin. He went down and out.

There was a dead silence. Everybody looked at me horrified, as though I'd hit a dame or something. They shrank from me.

"This man's out of Control!" someone cried.

"Call an Assistant!" yelled another.

Suddenly I remembered something. Doc Murtha had told me to stay right where I landed, so he could pull me back in five minutes with his radio. And I'd moved from the tree I was under first. I had to get back to it, or pay steamship fare back to New York.

But which tree was it? There was a lot of them in that little park. Then I spotted it, from a scar on its trunk. I

started hastily toward it, but just then I was grabbed from behind.

Two of these guys in little metal skirts had grabbed me. A third guy, an old bird with calm blue eyes, pointed a pencil at me. And suddenly my strength was all gone—I couldn't even stand!

"What is this?" I yelled, plenty mad.

"Moderate your voice, citizen," said the old bird impressively. "I am Tarnac, Third Assistant to the Controller."

"Nuts to you and the Controller both!" I cried. "I'll break your head and his too when I get my strength back."

Tarnac gasped. A cry of horror went up from all the crowd that was watching.

"He is almost utterly out of Control!" cried someone astoundedly. "He spoke disrespectfully of the Controller!"

"Never, in all our history, has there been a case so far out of Control as you," Tarnac said, looking at me dumbfounded.

"My temper's going to get out of control if you don't let me go," I said furiously. "You Egyptians don't need to think you can rough up an American citizen and get away with it."

Tarnac's lips tightened.

"This man is obviously mad—his weird garments show that," he said decisively. "But his being so far out of Control is a matter for the Controller to handle."

"I demand to see the United States consul!" I exclaimed. "There'll be an American cruiser around if you pinch me."

They didn't pay any attention. They marched me down the street toward the biggest pyramid of all. The two cops or whatever they were had to carry me, for Tarnac's pencil was still pointed at me and I still had no strength. I'll say that pencil was some hoodoo!

THERE were all kinds of rooms and halls inside that big pyramid, full of queer machines and busy people. They took me into a room deep inside the place. It was big and dim, and there was only one guy in it. He was sitting on a dais, doing nothing. I knew then he was the big shot, for only a big shot can do nothing but sit and look wise.

This guy had a queer metal thing on his head, like a big diving helmet, only the front was cut away so his face showed. There were a lot of little screws or knobs on the side of this helmet, and a little ring of glowing white lights on its top.

He was the Controller, all right. He looked down at me and I saw that his square face was very brooding and heavy and thoughtful, something like an alderman worrying about his ward, only a million times more so. Tarnac made a quick, sharp report to him.

"The man is obviously almost completely out of Control," Tarnac finished. "It's an unprecedented case."

"Call the physicians," said the Controller.

"Listen, I'm not sick," I busted in. "I was simply standing there in the park, minding my own business—"

I didn't get a chance to finish, for the physicians hurried in, a half-dozen of them. Two were dames, and one of these was a darned cute little trick with black hair and eyes.

They put on some kind of spectacles that were inches thick and connected to machines. They looked at my head with these as though they were looking right into it. Then one let out a yelp.

"This man is not an inhabitant of our world at all!" he yelped. "He is apparently from a world of very similar conditions, but his brain and other organs are definitely alien in structure.

"That explains it!" Tarnac said excitedly. "He isn't completely under Control because his brain differs from ours."

"You are undoubtedly correct, Tarnac," nodded the Controller. "His primitive brain receives the simpler elements of Control, such as language-knowledge, but is deaf to the higher elements."

"Say, what is all this?" I demanded.

"How did you come to this world?" asked the Controller.

"The stork brought me, of course," I snapped.

"The man is too primitive to give us much information," the Controller said thoughtfully. "Let the physicians thoroughly examine him—they may be able to discover his origin."

I bristled up, for I didn't want that bunch of doctors pawing over me. Then I decided maybe I'd better humor these guys. I'd have a better chance to escape and get back to that tree in the in the park where I had to be if Doc Murtha was ever to get me back home.

"I won't have all those doctors going over me," I told them. "I wouldn't mind that one, though."

And I pointed to the cute little black-haired dame among the physicians. The Controller nodded to her.

"You make the examination, Zura," he told her. "The man's primitive intelligence has apparently formed a liking for you."

Zura led me down a hall, with two guys following and holding those pencil-things, ready to put the blast on me if I made a break. The little black-haired dame took me into a kind of office filled with queer machines. The guards took posts outside the door.

Zura sat down beside me and put on those six-inch spectacles again.

"Please do not move," she said. "I want to examine more carefully the neurone-structure of your cerebrum."

"Aw, take them cheaters off—you look terrible in them," I said, taking the spectacles off her eyes.

"You're a swell dish, babe," I told her. "Want to feel my muscles?"

"I don't understand," she said, perplexed.

Well, seeing she didn't understand, I started to demonstrate for her. But she drew back all horrified.

"You mustn't kiss me! The Controller ordered me to examine you, and you are making me neglect his order."

"I wish you people would get this Controller guy off your minds," I said bitterly. "The big cheese!"

SHE gasped in horror, at me razzing the big shot. "You are out of Control, aren't you?" she said.

"Say, what is all this Control business, anyway?" I demanded. "I don't get it, at all."

"You mean there's no Control where you come from?" Zura said incredulously. "That people differ in ideals and aims?"

"I'll say they differ," I told her. "When they differ real bad, we call it a war."

"There was war here on Calthor, too, many ages ago," Zura said quickly. "People fought, and rioted, and quarreled constantly with one another, because they had different mental attitudes, different ideals and religious beliefs and aspirations. So our wise forefathers saw that to have perfect peace and cooperation, everyone must have the same mental attitude, the same loyalties, beliefs and desires.

"That is why our forefathers originated Control. It is a device to make certain that everyone has the same mental attitude on important questions. The wisest of our race is always the Controller. He wears the sacred Control helmet, the supreme achievement of our science, which amplifies and broadcasts the neuro-electric currents of his brain as a powerful vibration that affects every other human brain, setting up the same currents, the same basic ideas, in them all. Thus, what the Controller thinks is good, everybody thinks is good, and works for. So we dwell always in perfect peace and cooperation."

"You mean, because the Controller wears that helmet, everyone thinks exactly what he thinks?" I said.

"No, not exactly," Zura said earnestly. "If the broadcast vibration of the sacred helmet were turned on full force, then everyone would think and feel exactly like the Controller, would become mere automatons actuated by his mind. But the vibration is never turned on full force—it is kept just strong enough to condition our minds with the Controller's mental attitude, so that we automatically possess a common language, common ideals, common loyalty to the state."

"Some racket, he's got!" I said. "And whoever gets to put on the helmet is the big boss as long as he lives?"

"Yes," she nodded. "But of course the man chosen to be Controller is always our wisest, most peaceful, most

benevolent citizen. For his mental attitude becomes that of the whole race."

Suddenly, just like that, a red-hot idea hit me! An inspiration how to get out of this jam, back to that tree outside.

"Listen, Zura," I said cautiously, "I've been fooling you people. I'm not as dumb as I look."

"Impossible!" she exclaimed.

"What do you mean, impossible?" I said. "The fact is, I came here as a spy, see. There's going to be an attack on you."

"An attack? From where?" cried Zura, looking aghast. She hadn't had enough experience with liars to suspect me.

"I'll tell that to the Controller," I said cagily. "You bring him here and I'll tip him off to the whole thing."

She dashed out of the room. Before long, she was back and the Controller with her, wearing that queer helmet.

He came right in, leaving the guards still outside, and was I glad! You see, this bird had never known anything but utter respect, and never figured that anyone might pull something on him.

"What have you to tell me?" he asked.

"This!" I said, and gave him one on the chin.

He went down and out, his helmet banging on the floor. Quick as a flash I jerked that big helmet off his head. Its lights were glowing a lot brighter now, as though the power had got turned on more somehow when it hit the floor. I jammed it down on my own head.

THAT was my smart idea, see? If whoever wore the helmet was respected and obeyed by everybody, if what he thought they all thought, it was a cinch for me to get back out to that tree now that I wore the helmet. I felt tickled to death to have pulled it off.

"By gosh, my idea worked!" I said joyfully.

"I am happy—I am so happy!" cried Zura, her eyes shining with excited gladness, jumping up and down in glee.

The door opened and the two guards came dancing into the room. Yeah, dancing—and laughing wild with happiness.

"Joy, joy, joy!" they kept shouting.

And the Controller, who had staggered up to his feet now, grinned and laughed as though overjoyed! A big roar of voices came from outside the window. I looked out and saw the crowds out there in the streets all dancing up and down, crazy glad over something.

"What's the matter with you people?" I cried puzzledly, staring at Zura and the guards and the Controller.

And as I said it, they changed. The grins left and they all looked suddenly perplexed, staring around, puzzled as anything. The crowds outside had suddenly stopped yelling, too.

I couldn't understand it, but anyway my plan was working fine, for neither the Controller nor the guards had tried to take the helmet away from me. It showed how much they respected whoever wore it, I guessed. I grinned with relief—and the others grinned too.

"Baby, how'd you like to go back to New York with me?" I asked Zura. "I've fallen for you like a ton of bricks."

It was true, too, for now that I was all relieved and felt sure about escaping, I had time to look at Zura again and realized what a sweet number she was, and how crazy I was about her. But just as I said that, the Controller and guards tried to beat my time.

"Zura, I love you!" yelled the Controller.

"So do I! And I too!" cried the guards.

There was a pounding of feet, and men in dozens came busting into the room. Every one of them went for Zura.

"Zura, I love you!" they all kept yelling.

They crowded wildly around her, and more guys by hundreds were flocking into the building, all trying to get into this room, and every one of them hollering how much he loved Zura.

"Leave her alone, you muggs!" I yelled, burned up with jealously and trying to knock those guys away from her.

And believe it or not, every guy there

suddenly got jealous at the same time and tried to beat up all the rest.

"Let her alone! Take your hands off her!" they yelled, and then sailed into each other with their fists in wild rage.

Listen, I've been in some brawls in my time but that was the worst ever. The madder I got, the madder everybody else seemed to get. We rocked back and forth in the crowded room, swapping punches, everybody taking a sock at everybody else. And through the window I glimpsed the crowds out in the street, staging a wild Kilkenny too!

And suddenly I caught on to what was driving them all crazy. The helmet on my head—the thing they called Control! It must have got turned on stronger somehow when the helmet hit the floor. And now the Control was so strong that everybody thought and felt exactly the same as me, who wore the helmet. When I felt joyful, they all felt joyful, and when I got mad, they all got mad.

"Holy mackerel!" I said, appalled by it.

The fighting stopped dead as I said it. And everybody in the room was as appalled and scared as I was.

I got a grip on myself. I was going to get out of here, back to that tree in the park so Doc Murtha could yank me back from this nutty place. I started out of the room and down the hall.

EVERYBODY in the room started out at the same time. They hurried along, all looking as intent and worried as I felt. I didn't understand it until I got outside the building—then I did.

Everybody in the city was making for that tree in the park! I might have expected it. As soon as I thought of the tree, and how urgent it was for me to get there, everyone else thought of exactly the same thing. Thousands of people were heading for that park.

I groaned and ran forward, for I knew I'd never be able to reach the tree once that immense mob gathered around it. Everybody in the city groaned and sprinted at the same time I did. The harder I ran, the harder they ran—it was a crazy nightmare.

I stopped. I couldn't beat this mob to the tree and couldn't get through them once they gathered around it. Everybody else stopped as I did. I tried to figure something, and I was badly worried.

Everybody was badly worried. It would have seemed kind of funny, if it hadn't been so serious for me, to see all those thousands of people standing so worried, wringing their hands and frowning and walking back and forth, every one of them as worried as me.

I thought—well, I can take off the helmet and then make a run for the tree. But that wouldn't do. For as soon as the helmet was off me and they had their own minds back, they'd grab me and likely electrocute me for what I'd done to the Controller. I had to think of something else, and in a minute I did.

I put on a scared look, and hollered real loud:

"The park is dangerous—I must stay away from the park!"

You see, I figured they'd all get that thought and would shrink away from the park, while I went toward it. So I started toward the tree again, shouting out how I mustn't go near it.

It didn't turn out right. The whole crowd looked scared, just as I did, and they all chanted, "I mustn't go near the park! It is dangerous—I mustn't go near it!"

And while they chanted, every last one of the sons was going right toward the park as I was doing. It was no go. They'd be gathered a hundred deep around the tree before I could get there. So I quit and walked back from it, and everybody else walked back.

I felt pretty bad, by now. And believe me, there were some thousands of mighty blue people around me. The more discouraged I felt, the longer their faces got. A lot of them were heaving sighs, and some of them were crying. I got impatient at their misery.

"Shut up that bawling!" I yelled angrily.

I might have known it. Everybody else suddenly got impatient with the noise, and yelled for it to be stopped.

"Quiet, there!" they yelled at the top of their voices, all of them. It nearly

split my eardrums.

Then they all got blue again, as my worries came back. I didn't dare take the helmet off, and with it on, I couldn't get to the tree without thousands being ahead of me. It was an awful fix.

"Damn old Doc Murtha for getting me into this!" I muttered viciously to myself.

They all took it up, of course. They damned Doc Murtha with every kind of swear word they knew, thousands of voices making the air blue with curses. It did me good to hear it.

But how was I going to get out of this mess? I tried to sneak toward the tree without thinking about it, but everybody else hunched down and sneaked for it, too, pretending they were thinking of something else. I stopped and swore. Everybody stopped and swore with me.

By now I was plenty tired and also beginning to feel hungry, for I hadn't eaten since that morning. I decided I'd better try to dig up some chow, and then I'd feel better and could maybe dope out something. So I headed back along the street, looking for food.

Everybody in sight began to scatter. They dived into buildings, and every last one of them was hunting grub too. For a minute I thought my chance had come, and I turned and started back for the park, but of course everybody immediately dropped the search for food and started back with me. I gave it up and went on hunting eats.

ALL those thousands of people were after food the same as I was. Say, I didn't have a chance in that crowd—every time I looked into a building and spotted some grub, some guy was ahead of me grabbing it. And they knew where to find it and I didn't.

So I just gave up the idea of eating and wandered discouragedly along the street. They all dropped the food and began wandering aimlessly just as I was doing, all looking mighty low. I tried to grab up something to eat then, but naturally they all made a quick dive for it again, and I got nothing but a little piece of fruit.

Boy, it would have been bad for old Doc Murtha if he had showed up in that town right then. For as I wandered tiredly along I kept telling myself what I'd do to the old doc if I ever got hands on him. And of course all the thousands wandering in the city were muttering too just what they'd do to Doc Murtha when they got him.

Finally I stumbled wearily into another park, a bigger one that had a zoo in it, a lot of animals in cages. These Egyptian animals looked kind of different to me. I sat down tiredly in front of a cage that held a big ape with bright red fur. The big monk in the cage sat down too. And when I sighed wearily, the monk sighed too.

That kind of surprised me, for it showed the monk's mind was under Control of my helmet, the same as all the people. None of the other animals in the cages seemed affected, but I guessed the monk had a brain enough like a human brain to be affected by Control. And then I got a sudden inspiration.

Since that monk was affected by Control, then if I put the helmet on his head, all these people would be affected by his broadcast thoughts and feelings! And if they were under the monk's Control, they wouldn't all rush for that tree when I went there, and neither would they know enough to stop me and arrest me for what I'd done.

I went over to the cage and opened it. People from all over started for the cage too, of course, but this time I was ahead of them. Quick as thought, I took the helmet off my head and jammed it down on the head of the bright-red monk. He didn't seem to mind the helmet at first—he just sort of reverted to his natural mental life, and sat down on his hunkers and scratched.

All the people in sight sat down on their hunkers and scratched! They all felt itchy simply because the monk did. And the worst of it was that I wanted to scratch too—I felt itchy as the devil. But I fought off that feeling—I could resist it, you see, better than all the others here, because like the Controller had said, my brain was different and didn't receive the vibrations of Control so well.

So, fighting down that itchy feeling, I started hotfoot through the streets

toward that park where my tree was.

As I ran through the streets, I could tell by the crowds around me just what the monk was doing. First the crowds all started to climb—up the sides of buildings and monuments and everything else. I knew the monk must be up a tree. Then they came down and scratched some more. They hunted for water and began to drink. And then they stopped drinking and began to paw angrily at their heads.

I knew what that meant! The monk was annoyed at the helmet on his head and was trying to paw it off. I sprinted, for now the park and tree were in sight. And just as I dashed for the tree with the scarred trunk, all the thousands of people in the streets stopped pawing their heads and looked dazedly around.

"Oh, Lord, the monk's got the helmet off—they're out of Control!" I groaned, and ran the last few yards.

The crowd caught sight of me running. "Stop that man!" the Controller was yelling.

I DASHED up to the tree, colliding with its trunk. And nothing happened! Nothing at all.

"Doc Murtha, where the devil are you?" I yelled wildly. The crowd was coming at me furiously from all directions.

Bang! Something hit me hard, and I didn't know anything more. And when I came to, I wasn't there by the tree at all.

I was on the big copper platform of the machine in Doc Murtha's home. The Doc was reviving me.

"Martin, what happened to you?" he cried. "When I retracted the force-field to draw you back in five minutes as I had promised, you didn't appear! I've been trying it at intervals ever since, in the hope of catching you. What did you see?"

I got off the copper platform, and then I looked at Doc Murtha.

"Doc," I told him, "if you wasn't an old man I'd knock you into the next county. You doublecrossing so-and-so—why didn't you tell me you were going to shoot me to Egypt?"

"Egypt?" he cried. "You're crazy! You've been on another world entirely. The field was set to project you to a world across the Galaxy with conditions approximating Earth's conditions. What makes you think you've been in Egypt?"

"I saw the pyramids there myself!" I snapped. "And it is one dirty name of a place to send anyone—those Egyptians with their Control and Controller are worse than the Bowery! You're not going to shoot any more innocent fellows there, you old rascal."

And I grabbed up a big metal tool and laid into that radio-machine of his. Just three good wallops, and the works of it were smashed into a lot of ruins. I threw down the tool, feeling mighty good to have saved some other guy from going through what I had.

"You fool!" Doc Murtha screamed. "You've destroyed t w e n t y years' work."

"Here's your grand back," I said, paying no attention to him. I headed for the door. "Me, I'm going back and get a job as sparring-partner for the champ. It's easier money!"

A BRAND-NEW, FASCINATING FEATURE

By J. B. WALTER

THERE IS ICE IN YOUR BODY!

THE water in certain parts of the animal body is actually frozen. Science catalogues six kinds of ice. Type No. 6 may exist at body temperature, though only under enormous pressure—somewhat over a hundred thousand pounds per square inch. Believe it or not, these enormous pressures ex-

ist in the human body because of the great affinities of body proteins for water, for much of what we erroneously call fat in the body is nothing but a very compact jello—that is, gelatin, hydrated and hard.

Living muscles contain a great deal of water, yet not a drop of this water can be squeezed out any more than one can hope to squeeze water from ice.

CANNING CULTURE

IF THE world is still turning in 8113 A. D., our descendants may open a sealed and dated museum containing relics typical of our life today. Dr. Thornwell Jacobs, president of Oglethorpe University, in Georgia, is canning culture for posterity. 6,176 years have elapsed since the first fixed date in history. So a date 6,1.76 years hence has been chosen for the unsealing of the museum.

Dr. Jacobs has had constructed an airtight subterranean vault for the collection. Motion pictures, illustrated magazines and books, phonograph records of addresses by representative Americans (the President of the United States will greet the 82nd century from a phonograph record), models of automobiles, steam engines, sewing machines will be included.

Special stainless steel receptacles will preserve the contents. He's counting on the sportsmanship of posterity to resist temptation until 8113.

THE FIRST TELESCOPE-USER

A SIMPLE device known to every schoolboy would have saved Galileo, inventor of the telescope, from dying blind. Galileo was daring when he first turned his telescope on the sun, for he discovered its surface by looking at the dazzling disc directly without any device for weakening the intolerable brilliance. Though positive evidence appears to be lacking, it is only too probable that this zeal in the cause of observation led to his eventual blindness.

Galileo's telescope, with its concave eye-lens like that of an old-fashioned opera glass, did not permit of the simple device so familiar to the modern observer of projecting an image of the sun on a white surface held a foot or so behind the eyepiece.

It is strange, however, that the simple device of smoking the outer surface of the telescope with the soot from a candle flame—a device familiar to every youth who has ever studied an eclipse—did not occur to Galileo. If it had, he might not have died blind!

THREE HUNDRED LETTERS ON A PIN POINT!

EVERY few years we read in the daily press about the remarkable feat of some engraver who has inscribed by hand the Lord's Prayer on the head of a pin. Now a machine comes along which far eclipses this achievement, and demonstrates beyond

question the superiority of the machine over hand craftsmanship, by engraving the prayer on a pin point!

The feat was accomplished at the plant of the George Gorton Machine Company at Racine, Wisconsin, using a standard Gorton duplicating machine. The machine engraved all 300 characters within a circle .005 of an inch in diameter, about twice the diameter of a human hair. A pantograph arrangement was used, by which the prayer, which had previously been printed within a circle about 2 inches in diameter, was duplicated in these microscopic proportions.

OUR INCREDIBLE EARTH

IT REQUIRES 3,000 cocoons to make a pound of raw silk. The worm which spins each cocoon eats fifty times its own weight in mulberry leaves. Japan's export of 73,000,000 pounds of raw silk in 1935 was the lifework of some 220,000,000 worms. . . .

Birds can see with their eyes closed. . . .. They have an extra pair of transparent eyelids! The owl, alone, of all birds, has his eyes facing directly forward, like a human's. However, he cannot roll them in their sockets—they are immovable—fixed! Nature makes up for it, though, by giving the owl a neck that revolves like Edgar Bergen's dummy. . . . All other birds have their eyes in the sides of their heads, so the two eyes never look in the same direction. . . . Soldiers in a termite colony are completely blind. . . . And the snake never closes his eyes, for he has no eyelids!

YOUR HEAD IS STILL GROWING

THE brain inside your head continues to grow until the age of fifty or sixty years. Evidence for this invisible growth, detected by measurements of great numbers of human heads, is reported here by Dr. Alex Hrdlicka, noted anthropologist of the U. S. National Museum.

That the human head continues to grow, until old age sets in, is demonstrated by Dr. Hrdlicka's own measurements of American heads. Foreign scientific studies reveal the same growth phenomenon on other peoples. Dr. Hrdlicka has concluded the most logical cause for this head growth is that the brain itself is growing, since there is no evidence that the scalp or bones of the vault thicken with age.

HUMAN CLOCKS

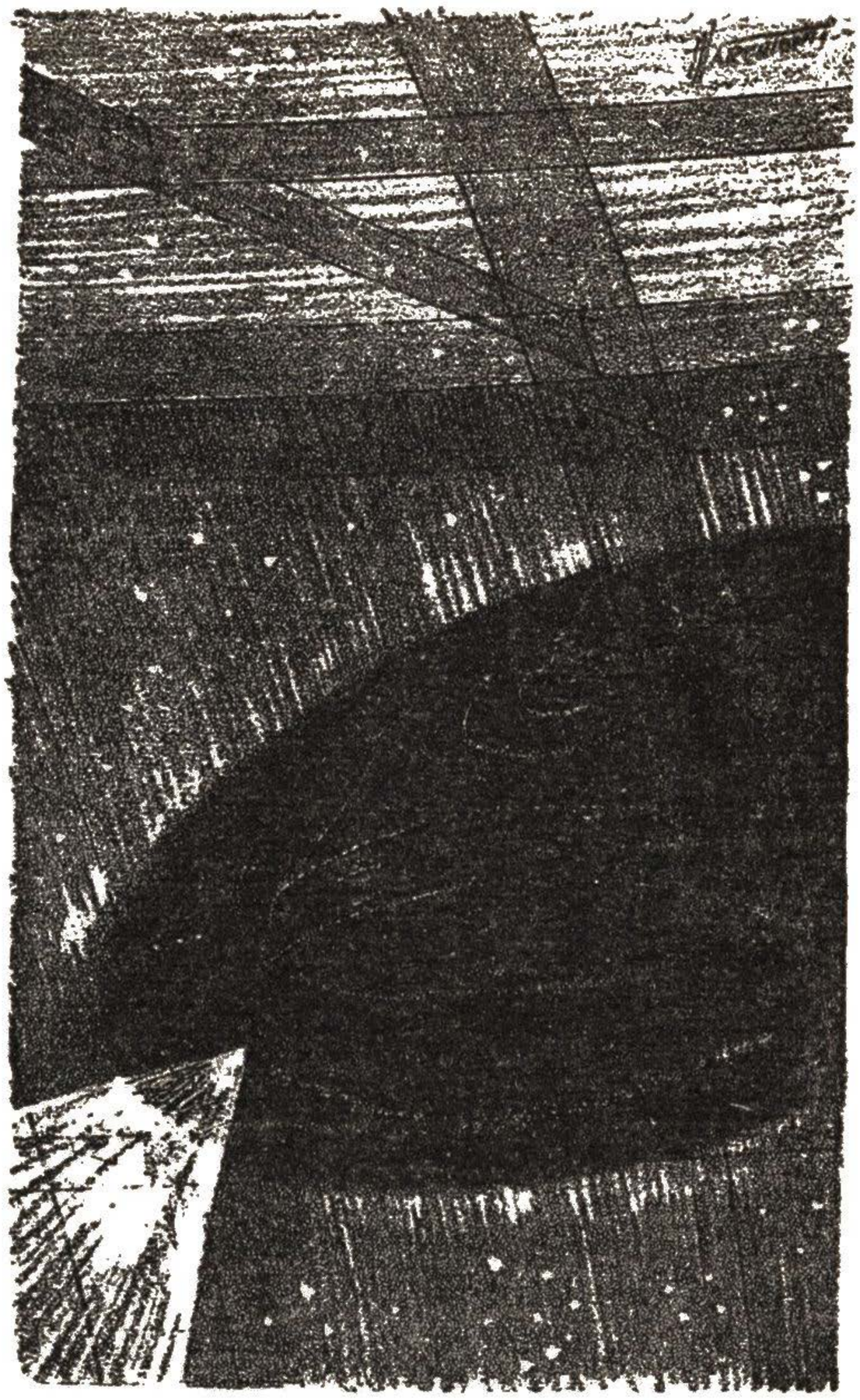
SOME people can tell time accurately without watching either the clock or the sun. Scientists in Princeton University got to thinking about this, studied human brain waves, and recently reported that we all have "electric clocks" in our heads, but most

of them make poor timepieces because they run too fast. These brain "clocks" tick from 10 to 40 times a second. At each tick an electrical wave spreads out from the cerebral spheres. This goes on whether you're awake or asleep. Some day, perhaps, we may all be walking alarm clocks.

ROAMER of the STARS

Marauders From Another Sun Navigate the Spaceways Searching for a Life-Element

By CLYDE WILSON



The shapeless mass blotted out the stars

HANGING apparently motionless in space, yet keeping pace with the rotation of the Moon around the Earth and the Earth's swing through space around the Sun, a strange mass waited. Like a huge, elongated discus, massive enough to cover an acre, it blotted out the light of the stars behind it. Yet by no other means could it be seen.

For it was black, deep dense black, with that true lack of color that reflected no light. It lay in the zone of neutrality between the Earth and Moon, where the Moon's gravitation matched that of the Earth.

On the almost flat surface of this mass, stood two figures in airless space. They resembled men grotesquely. Their shoulders were wide, their heads sunk down upon them, and their legs were like gnarled oaks. Their heads were square, almose featureless. They had only two brilliant eyes set deep in their sockets, and a gashlike mouth. No ears or noses. Like the mass, they, too, were invisible.

Before them was a short tripod, the top of which was a hooded ball, in which flashed colors no Earthly eyes could see. They looked from this to a tiny speck in space in the direction of the Moon. The hooded ball showed this to be an Earth-Moon space ship, headed for Earth.

"It does, indeed, carry radium salts," the larger one of the two figures informed the other, although no sound left his lips. "Fate is kind, indeed, and we must be kind to the occupants of that craft. There may be men like us even in this strange Universe. Remember, Drangee, no violence." Silently and without visible power the mass moved forward into the path of the space ship.

The one addressed as Drangee turned away from his companion so that his thoughts would not be intercepted by the other. He fondled a strange instrument in his hand, shaped like a long metal vase, a magnetic flame gun.

"We are starving, Euclar, starving," Drangee thought, a bitter smile on his face, "and you speak of kindness. For the lack of radium we must perish. To barter with them might mean failure, but with this there can be no failure. No living thing can withstand its bolt of charged positive nuclei. You are in command, Euclar. But for once Drangee, the lowly, takes command."

UNCONSCIOUS of impending peril, the Luna-Earth Spaceways Navigation's freighter, Perseus, sped towarded Earth in the capable hands of Captain Mansell and his assistant on duty, round-faced, tow-headed Perry Dubold. Behind them, Earl Shafton, apprentice spaceman, watched with admiration. The young, tall, dark-eyed apprentice was eager to learn all he could on his first voyage.

The ease with which Captain Mansell and his assistant read their positions from the recorded observations on the Demson navigator's reeling tape did not erase the lines of anxiety from Shafton's brow. He could not forget that they were carrying the most valuable load of their time in the eighty ton cargo of coronium ore, the strange radiolite substance that would revolutionize industry. True, there had never been any space pirates in their time. Nor had the discovery of this valuable substance on the company's Moon mines been generally known. Yet here they were in space without other than light armament, without even a United America's or Europia's space defender near.

Foolish. There was no danger. Yet this slow freighter, intended only for the short journey between the Earth and Moon, and heavily loaded with valuable cargo, would be a knockover for a swift and armed attacker. Suddenly he was hurled backward, saved only from falling by the attraction of his steel-lined space boots to the magnetized floor that served as gravitational pull when they were far away from either the Earth's or Moon's attraction. Mansell laughed shortly. He had touched the rocket control, and the cruising ship had suddenly surged forward.

"Mr. Shafton," the captain spoke up, crisply, "a good spaceman should never be taken unawares by changes of direction or speeds."

"Excuse me, sir, I forgot," said Shafton, his face crimson with mortification. "I am afraid I am a little nervous. Our cargo—"

Captain E. Allen Mansell spun around and surveyed his young assistant, disapproval on his hawklike face.

"Shafton," he said, "confidence in your commander is as necessary as discipline. I have never found an emergency that I was not equal to. Besides, there is no danger—"

As if in answer, a loud clangor came from the Orford mass detector, on the wall back of them. Dubold shut off the rockets, while Mansell leaped to the telescope. Dubold narrowed the detector beam to a tiny spear of electron stream, and turned to the screen. The feed-back of that narrowed beam would detect a tiny mass a thousand miles out in space through the disturbance of its flowing electrons and locate it in space as accurately as if sighted by a gun. At the intersection of the cross-bar lines a tiny shadow showed like a blot of ink in its intensity. Yet Mansell

could see nothing.

Mansell changed the course of the ship slightly and the clangor ceased. Dubold shifted the needle beam a bit and located the mass again. A lightning calculation by Mansell told them that the mass was at least fifteen hundred miles ahead. Its detection informed them that the mass was large enough to be seen with the naked eye. Yet Mansell had seen nothing.

Mansell and Dubold looked at each other doubtfully, but Shafton was not watching them. Instead, he had his eyes glued to the gravitator as if he could not believe what he saw.

"Strange, I could see nothing," Mansell admitted to Dubold, in an undertone. "Must be a phenomenon of space, something we don't understand. However, we are out of its path."

"Could it be a flaw in the instruments?" asked Dubold, doubtfully.

"Mr. Dubold," replied Mansell, frigidly, "I, myself, have personally selected these instruments."

HE looked toward Shafton as he spoke. A flicker of alarm crossed his sharp-cut features as his attention riveted upon the young spaceman's face. For Shafton's eyes were staring aghast into the gravitator's dial.

"The gravitator!" Shafton cried. "It has swung over to 10-x."

"Impossible," the commander snapped, "why—why, it is unthinkable. There must be something wrong." Suddenly he switched the floor magnets off. So sensitive were the spacemen's sensations to gravitational pulls out there in almost weightless space, a slight but decided tug toward the prow could be felt. Again the commander scanned the surrounding space.

The mass detector screamed once more and the blot almost covered the center of the screen. The thing had moved into their path again, and was now very close. Again Mansell switched the course by using the rocket controls. The blot disappeared again, but the gravitator needle swung still more to the right.

"Men," said Mansell, quickly, "we are passing a body of very great weight, one that may have evil designs upon us. If it were merely a space ship that somehow had a means of increasing its gravitational pull artificially—if that were possible—our mass detector would not show such a dark displacement at the distance my measurement showed it to be when I first discovered it.

"Our instruments do not lie. We are near a body so strange in its physical make-up as to be almost inconceivable. Its gravitation must be equal to the planetoid Eros, yet it is invisible. Whatever it is we must avoid it at all costs. Every man must be at his post. Dubold will operate the needle mass detector, I will infra-radio Earth for a space cruiser, but it will be hours before it reaches us. With speed we may outdistance it, but if it attacks we shall fight. Quickly, now."

MOVING obliquely so that its path would presently cross that of the *Perseus*, the dark mass drew closer. The two dark figures grew tense as the gleaming, bullet-shaped space freighter drew nearer, falling into the net they were evidently trying to avoid. Smiles came to the dark faces as they, looking with ease through the shell of the space ship, noted the frantic efforts of the Earthmen to catch a glimpse of their attacker. Then the space freighter suddenly shot ahead in a burst of speed.

"Quick, Drangee, they are escaping us," the soundless voice of the larger one cried. "Your magnetic flame gun. A web of kinemagnetism will not hurt them. And it will bind their ship to us that we may barter with them. Hurry, lest they are gone forever."

Again Drangee turned away so that his thoughts would not be intercepted by his companion. His eyes glittered balefully as he raised the flame gun. Unseen by his companion, he set the gun at concentration strength. A scattered charge of positively charged nuclei would throw a web of magnetism about the speeding Earth ship that would bind it to the dark invader. But the freighter's speed would probably break the bonds. At concentration strength the magnetic flame gun became a weapon of destruction, hurling

a charge of positive nuclei that would tear and burn its way through any known substance. With an aim that was uncanny, Drangee sent the bolt of destruction through the speeding Earth ship.

No sound of that terrific explosion could pass through the airless space but Euclar saw the blinding blue flash and realized its meaning. He turned upon his companion.

"Drangee, this is treason!"

Drangee turned an embittered face toward his superior. Ages of despair and suffering, mingled with greed and rebellion were written there.

"Treason, is it?" he snarled, if a soundless voice could snarl. "Euclar, I have followed your commands for a lifetime without protest. I have never questioned your wisdom. Together we have seen our companions die one by one until at the threshold of death we are all that remains of that band that left Amaric ages ago. Now that we are in this strange Universe, too far away from Amaric ever to return, we are faced with starvation, due to a lack of a radiolite. On that tenuous craft out there is a radiolite that would prolong our existence, yet you hold to the principles of Amaric ethics, and attempt to barter for our very existence.

"Euclar, I have rebelled. I shall destroy whatever living things that are in that craft, take their radiolite, perhaps later visit their planet, and show them how puny and insignificant they are. Nothing can stop me now."

He pointed the gun at Euclar, its concentration beam set at full strength. But before he could fire his eyes locked with Euclar's. No fear, no threat, no reproof lay there. He met only the calm, steady gaze of the larger being. Slowly, he lowered the muzzle of his ray gun.

SHAFTON was hardly in the corridor when the bolt from Drangee's gun struck the ship. There was a scream of tortured metal, a sudden jolt, a streamer of radiolite from the cargo past his head, and the ship's lights went dead. But in that moment the blue light from the flash penetrated the ship like an X-ray and Shafton caught a glimpse of a dark mass lying on their starboard side through the momentarily transparent side of the ship.

In the observation room Captain Mansell was looking through the telescope in the direction of the disturbance as indicated by the mass detector. Through the telescope, with its concentrated strength, the light was blinding, but in that moment Mansell saw the two figures on the body of what seemed to be a tremendous space ship, as large as an Earth building. Dubold, too, had seen the mass through the side of the ship. He, too, had seen the streamers of radiolite as the projectile had carried it through the observation room hardly a yard from his head.

Flashing his torch, Shafton ran from the corridor to see Mansell staggering around the room holding his eyes and Dubold looking helplessly on. The fear that had been in Shafton's heart trickled away in the face of the great emergency. Dubold was white, trembling. He stood alone, helpless.

Shafton jerked open a port shutter and a spear of sunlight cut a beam through the control room, flooding the room with light. The captain was groping silently for the medicine chest, his face contorted with pain. Shafton hastily seated him in a chair, pressed a saturated pad of lotion to his eyes. Then only did he notice that the hiss of the rockets had silenced, that the infra-radio tubes were dark.

"Can't you do something?" he appealed to the stunned Dubold.

"What's the matter?" echoed Mansell, pressing the pad hard into his stinging eyes. "Why have you stopped the rockets?"

"They're dead, sir," gasped Dubold. "I can't get them started."

"Dead? Then that bolt that struck us must have broken the controls. When that flash came I caught a brief glimpse of our attacker. I saw a tremendous space ship and two beings on its surface. Can you see them now?"

"No, sir," replied Shafton, "but the gravitator shows them near."

"Boys, we are in for something now," the captain continued. "That it intends to attack us, I am certain. I am blinded. I must depend on you." Du-

bold said nothing.

"Just give us your commands, sir," Shafton said simply.

Dubold nodded in agreement. "Shafton," the captain continued, "waken Perrier at once. Something must have happened to him if he isn't here. Dubold, see if the blast opened any holes in the ship's side, else we will strangle when the air leaks out. Then one of you must repair the rocket controls. Curse these robot-controlled ships. We need men!"

As Shafton feared, Perrier was dead. He lay in his cabin sprawled out on the bed, a blue bruise on his temple, his eyes shut as in sleep. Behind him, on the wall, was a bulge in the metal of the ship's side, burned a blue-black, but still unbroken.

The bolt, only a few inches in diameter, had passed through the wall, grazed Perrier's temple, then passed out through the hold and through the control room where it had passed out again in space. Silently, Shafton drew the covers over Perrier's face and made his way back to the control room.

THREE grim-faced men huddled over the control board. Dubold was examining the controls; he was less nervous now. Shafton was staring out into space toward where the attacker must be. Brilliant pinpoints of light gleamed out of an inky sky. Then a shapeless shadow covered the sky, blotting out part of the stars.

"I see it," he cried. "Why, we are circling it. The stars are revolving around us." The Sun that a few minutes before had been on the other side of them now shone into the port shutting out the light of the stars.

"We are caught in its gravitational pull," came the tense, even tones of the captain, as he pressed the pad into his aching eyes. "It has stopped our forward journey and now we must circle it until we fall into it. We are helpless with dead rocket rotors. If we could only repair the rocket controls and work them by hand, a mighty tug may break us loose."

Dubold, hardly hearing, looked up from his calculations. His face was gray, his lips a thin white line.

"Captain," he gasped, "the findings show this thing is standing still in space, holding us here. Do you know what that means?"

Silence fell upon the others. Neither needed to ask what that meant. In this slow heavily loaded freighter their top speed was only a fraction of the Earth's orbital speed. Carried in the Earth's swing around the Sun, to pass out of this gravitational attraction meant they were stranded in space. Even now the Earth was rushing away at a speed of eighteen and a half miles a second.

"We know," came the captain's calm voice. "We are trapped, caught out in space. If we break away from this thing, we become a space wanderer, helpless as a rowboat in the ocean.

"For myself, I would rather die resisting this attacker than throw ourselves on his mercies. Never has a Mansell, on sea or in space, given up his charge without a struggle. But now," he added, bitterly, "I am no longer in control, blinded as I am. I cannot ask you men to share Perrier's fate."

"I am with you, Captain," cried Shafton. Even Dubold nodded.

"Then you, Shafton, attempt to repair the rockets. Dubold will keep watch. Once they are repaired, we will make a break for it, hoping they do not attack us again."

The gravitator showed they were being slowly drawn into the clutches of the invader. Shafton worked feverishly, an oxygen mask on his face to protect him from the deadly radiolite fuel leak. Working in close quarters, he literally tore masses of bars and wires from the inner workings of the rockets, his mind feverishly trying to remember the details of their intricate design. Before he was finished an intense blue glow filled the compartment, and, as when the bolt had struck the ship, the walls became partly transparent.

He again saw the invader, now so close he could see the two figures of Euclar and Drangee through the walls of the *Perseus*. He clutched the extension telephone and the voice of Mansell came over the wire.

"They have thrown some kind of

magnetic web over us," the captain informed him. "It is drawing us closer. Now we have broken away again." The blue light disappeared as they passed around the invader to its other side, away from the figures. Shafton could feel a lurch as the web released its grip. "We cannot resist our fall more than one more revolution," the captain continued. "Are you finished?"

SHAFTON worked frenziedly at a last obstacle.

"In a minute, I hope," he replied.

"Then listen," the captain went on. "When we next pass them, they will probably draw us down. Load the rockets with a heavy charge of fuel. Gravitation has drawn our stern toward them. When we pass over these creatures the rockets will be pointing at the enemy. At our distance, the blast from our rockets will easily envelope them. No living thing can survive that searing heat. Dubold will take observations. When I give the signal, fire the blast at them. We will avenge the death of Perrier."

Hurling the debris into an empty fuel pocket, Shafton hastily made temporary connections with an auxiliary battery, then charged the firing chambers, working the loading breech-butts by hand. The swing of the Sun showed he had finished none too soon. Hardly had he telephoned to Mansell, when the blue light enveloped them again and he felt the pull toward the strange craft. Through the transparent hull he saw the dark mass, now so close that they seemed hardly fifty yards away. The seconds dragged like hours. With a final lurch, the *Perseus* fell into the dark mass.

"Fire!" cried the captain. Shafton reached for the switch and he seemed to sight the two figures down along the barrel of the rocket jet, directly below. The switch closed. There was a blinding flash, and a volcano of flame belched out, splashing in a crimson cloud over the surface of the dark mass. The *Perseus* leaped upward as if shot from a gun.

For one moment the dark figures stood motionless, enveloped in the searing flame. Yet the taller one still held the magnetic gun upon them and the blue light still sprayed unwaveringly from its mouth. The other crouched, and with a mighty spring hurled himself straight at them.

The magnetic web had arrested their motion but this creature came hurtling upward, limbs spread out like a starfish. Amazed as he was, Shafton was hardly prepared for the shock given the ship as this creature struck. It was a terrific blow, seeming as if they had collided with a large meteor. The sides of the ship buckled and folded inward. The jolt hurled Shafton sternward. Only presence of mind saved him from a knockout fall. He had caught a bar with a jolt that almost tore his arms from their sockets.

Still illuminated by the blue light, Shafton saw the creature grasp hold of a buttress and begin to tear at the ship's side. He tore out huge pieces of thick lustro-magnalium as if they were putty. In a coal-black face Shafton could see two points of gleaming black staring balefully at him through the sides of the ship.

In a few minutes the air pressure would seep out through the hole this creature was making. The oxygen mask would save him from immediate strangulation. But he did not have a spacesuit on and his limbs would swell when the air pressure started to drop. Then there was Captain Mansell and Dubold.

He thought of his trinite gun in his compartment. Could such a puny weapon harm a creature that had withstood a rocket blast. The tough metal of the ship's sides, although torn in chunks, still held the creature out. It shook the buttress with a mighty heave, warping it so that the ship's ceiling sagged.

THE metal groaned as it hammered savagely at the buttress. If only it could be lured to the end of the buttress. There was still one unfired rocket—it offered a slim chance.

Shafton dived at a fuel compartment at the far stern. The creature looked at him, followed him out to the end of the buttress. For a moment it stood balanced there, holding on to the

smooth end by clamping its feet against the sides. Shafton back-dived at the switch and closed it. A blast from the rocket and the ship literally hurled itself out from under the feet of the surprised creature.

In his haste Shafton could not protect himself from the sudden surge. His head hit a strut. Through a million shooting lights he saw the ship had turned and was hurling itself into the dark mass.

Lights blazed, whirled and striated before Shafton's eyes. The whole Universe seemed to parade before him as his mind raced over myriad subjects; science, history, peoples, geography. Something seemed to be probing his mind, ferreting out knowledge long forgotten.

His eyes came open with a start. He was in the rocket room, and still the strange blue light shone in from without. But now he was on the surface of the dark mass while outside a dark figure like the one who had attacked him stood looking at him through the translucent walls. He wondered dimly where the captain and Dubold were.

"They are in the forward compartment, unconscious but unhurt," something answered him. Shafton started to his feet, staring at the dark creature before him.

"You wonder how I have spoken to you," something seemed to be telling him, though he heard no sound. "We Amarans have long understood the secret of soundless communication. While you were unconscious you answered many questions. I shall reciprocate." Shafton realized that this creature used a kind of telepathic communication.

At close range Shafton could hardly see this strange being plainly. It was so black that even in the blue light it seemed more a shadow, shaped like a heavily built man about six feet tall, with two points of brilliant black light gleaming from its head. In its hand was an instrument shaped like a long vase, from whose nose scintilated streamers of intense blue light. As he looked past this creature he saw another figure in the space beyond, circling the dark mass like a satellite.

"I am Euclar, late of Amaric, a planet of the suns you call Sirius and Sirius B. Like Sirius B, Amaric is composed of dense materials thousands of times denser than your Earthly kind. To us, your densest metals seem like a tenuous gas. I am composed of materials similar to those in your organic structure, but in my case they are so dense that it would require a man half a mile in height, compacted to my size, to make my weight."

Shafton felt the other's messages like sounds beating against his temples.

"You have a theory," continued the soundless voice, "that Sirius B, or Saaron as we call it, is composed of stripped atoms such as seen in the hotter suns, where the outer electrons are stripped away. This is not the case with Amaric. Our atoms are not stripped away, simply packed within the atom itself. This gives our elements tremendous weight, although they may easily be converted to your tenuous state. In our state to you they would be neither hot nor cold, simply quiescent. That is why your rocket blast had no effect on us."

SHAFTON interrupted.

"How do you run your ships?"

"Our space ship is propelled by power of which you have no conception," the being answered. "It is composed of common metals, yet so closely are their atoms packed, that the weight would be inconceivable to you. Since the density has a tremendous effect upon the surface gravitation of a body that is why this space ship as small as some of your larger buildings, has the gravitation of your larger planetoids."

"But you? How came you here?" Shafton cried.

"Against the advice of the wiser heads some of we younger Amarans constructed this space ship. We set out. To be brief, we lost control of our ship and wandered far out into the cold and dark highways of space. For a thousand of your years we wandered in that vast void between our suns. Far away from Sirius we gained control of our ship but we could not return. I was young when we started, I am old now. One by one our com-

panions died and were consigned to endless space. Only Drangee and I were left.

"Drangee is now a satellite of this space ship, a just punishment for his attempt to take life, a crime denied by the creed of the Mandrens, to which we belong."

"A thousand years," thought Shafton, "how could you exist so long?"

"We do not breathe," replied the other. "Oxygen comes to us in our food which is why I may stand out here in empty space. We have discovered a method of transmuting elements with radioactive substances, a method far easier with our closely packed atoms. We used our food over and over again, but on each conversion something was lost as energy and eventually our supplies dwindled.

"Then, too, we have used up all our radium. So here in your Universe we were threatened with starvation. When your space ship came along with a cargo of radiolite, our hopes were freshened. I wished to bargain with you, but Drangee, desperate with hunger, revolted and attempted murder and robbery. His rashness is the cause of his end.

"When your ship turned and headed this way, it was all I could do to land you safely. Your companions were unconscious. The leaking air from the front compartment had done for them. Fortunately, I was able to seal it in time. They will soon recover.

"As for me, fate has played its last card. Even with your radiolite, existence for me would soon end. Although Drangee deserved his fate, he leaves me with a lonesomeness I cannot bear. Rather than leave this space ship a menace to your people, I shall head it into your sun with our last remaining power, carrying Drangee with me."

Tears he could not control came to Shafton's eyes. There was something tragic in this powerful figure, a stranger in a Universe as tenuous to him as the outer blanket of the sun Betelgeuse.

"Please remain," begged the young spaceman. "Earth will try to make existence for you and Drangee possible.

"Then again," suddenly thought Shafton, "you may be of untold assistance to us of Earth with your power of transmutation of elements. What power that knowledge would give any nation!"

ON THE dark face of his companion Shafton seemed to see a fleeting smile.

"I realize that," the other returned. "It would be a power with which one nation could crush all others. No, it is better that I pass out of your existence.

"In the room with your companions I have already placed two small objects that you might take for bits of carbon. The lighter one is concentrated oxygen, the other is rocket fuel. Placed in a container with some of your radiolite, they will gradually expand to your density. Used sparingly, the oxygen will carry you to the end of your trip. Though it is but a tiny concentrated piece, should it be suddenly expanded to your density, it would blow this ship to atoms. Together with the rocket fuel you should be able to complete your journey safely."

Shafton turned and looked hopefully out of the port on the other side of the room. He knew instinctively that the Earth was in that direction. Two brilliant objects, one as long as a baseball, the other the size of a golf ball, stood out among the stars. Speeding away from them at better than 65,000 miles an hour, the Earth and Moon were hurtling away. Shafton shook his head sadly.

"You forget your fourth planet is coming into your zone," the other said, reading his thoughts. "Mars will soon be thirty-five million miles away."

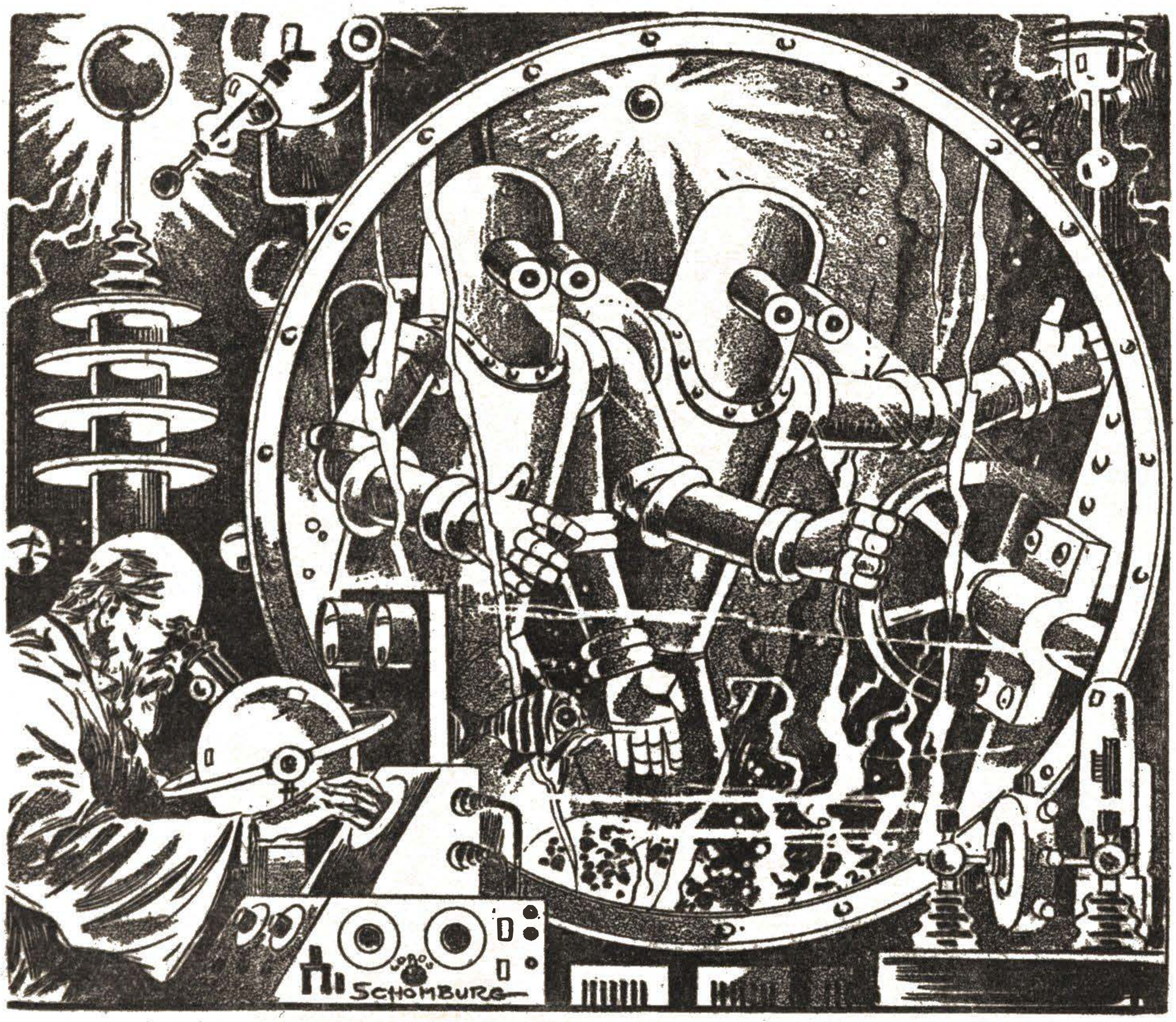
Mars, where even Luna-Earth Spaceways had a station. Yes, they could make it whereas the Earth would soon be one hundred and eighty million miles away.

"And now, my friend, good-by!"

Shafton turned to Euclar, trying to frame a protest, some word of condolence. The blue light flickered out, a dark void lay below the *Perseus*. There was a slight grating noise, a sensation as of sharp descent. The dark invaders were gone.

With misted eyes Shafton turned toward the control room.

A Man-Created Robot Eye Probes the Submarine World for Strange, Abysmal Secrets!



The floating crystal relayed its glimpses through miles of water

GLIMPSE

By MANLY WADE WELLMAN

Author of "Dream-Dust from Mars," "When Planets Clashed," etc.

JOEL DUNDONALD had no family, no friends, no wealth—only a modest income and his house by the sea.

That house was remote from towns, from other houses, even from roads. Its walls and roof were strung with wires, two masts above it supported a hammocklike aerial, and at one side stood a soaring antenna, like a perpendicular girder hundreds of feet high, dwarfing all else. Of the rooms in the house, only one was habitable, with a cot, a chair, a desk, a shelf of books. All the rest, upstairs and down, whirred with machinery and reeked with oil.

There were rows and rows of storage batteries, arrangements of complicated motors that sang together like a mighty and monotonous choir, dynamos, switchboards, and, in the drawing room that was now the control center, a great cabinet with dials, levers and gauges. All this would mean radio to any electrical engineer; but there were

no earphones, no loud-speaker, no familiar sending or receiving equipment. Only, on a stand beside the cabinet, was fastened a silvered globe a foot in diameter. From this protruded two tubular eyepieces, like those of a binocular microscope.

The afternoon sun beat through the open door to seaward as Dundonald sat down before the stand. His gray old head bent eagerly forward as he fingered the instrument board, checking every point. He permitted himself a faint, tight smile of satisfaction.

He was a scientist, in the purest sense of the word. He was content to achieve miracles, not to profit from them in gold or glory. The best years of his life had gone into the construction of this houseful of apparatus. There had been disappointment, failures, painful retracings of footsteps, but he had succeeded beyond the most brilliant technicians of the radio field—had succeeded even beyond their most fanciful dreams. Before and around him was the complex fabric of a television set that overshadowed all previous attempts in history.

From a drawer in the stand, Dundonald took a small cotton-filled box. Carefully be extracted from it what seemed to be a crystal marble less than an inch in diameter. His faint smile widened. Within the small compass of this simple-looking pellet was lodged a tiny mechanism, the most delicate and revolutionary in the world. It represented more enterprise, imagination and workmanship than all the rest of his apparatus combined.

First of all, there was within it the power to see and register images. The development of that power had required years of heart-straining research and experimentation in photomechanics. His materials had included wires and screens of the most costly elements, as minute in their exquisite accuracy as they were gigantic in their conception.

TOO, he had employed nerve tissues of animals, treated to do things that they had never attained during their organic life. Included with this power was another—that of independent and almost limitless flight, occasioned by a diminutive motor that could receive and use at a distance the current from Dundonald's dynamos. The crystal ball was, in short, an eye. An eye that could not only see, but fly, roam, travel at speeds and in directions to suit its operator, transmitting its impressions across the intervening space.

He laid the bright particle beside the globe, then turned back a hinged portion of the stand's top. Underneath was a sort of keyboard, upon which he laid his hands as though to strike a chord upon a piano.

A new vibration rose, more intense than that which had involved the houseful of motors. The little crystal ball stirred, then floated slowly upward like a bubble. Dundonald shifted his careful fingers on the keys, and the pellet paused, hanging motionless in mid-air a little higher than the scientist's head.

Dundonald bent and peered into the eyepieces. Immediately it was as if he saw himself from above. Tousled hair, furrowed brow, sharp nose half hidden by the twin tubes into which he gazed—again he smiled his triumph. The vision was as clear as that of the human eye itself.

He drew back and struck yet a third combination upon the keys. The little mote that was his roving viewpoint sped out of the door like a winged diamond. It rose birdlike in the sunlight, then, as Dundonald shifted his hands once again, it dropped downward into the clear, gentle sea.

Back he jerked to peer into the globe, his hands manipulating the keys. Now it was as though he were surrounded by green light that rippled visibly around and upon him. Above—he could see above, it seemed, without shifting his head—shone a vast, mirror-like expanse. Below mingled brilliant colors, red, blue, deep green, gray-black. He could make out fronds, leaves, stems, in rhythmic motion. Here was a vast sea-garden, swaying gently with the current of the ocean floor.

So vivid was all the impression that at once he felt himself joined to the

artificial eye beneath the waves. The movements of his hands on the keys were little more than subconscious will-efforts to guide him. The sea-garden slid along beneath, strangeness adding to beauty as it swayed and shimmered in the diluted green light.

Dundonald would have lingered above that submerged loveliness, but the scientist in him reflected soberly that any man might see as much from a glass-bottomed boat. He was wasting his time and the power of his set. He must explore further, into the unknown that the human eye had never beheld.

His hands on the keys quickened the pace. His vision sped to deeper water. The colorful beds of weed dropped farther and farther down, became dimmer and dingier as the fathoms multiplied above them. He let the crystal sink and his viewpoint with it, saw the light change from green to gray as he skimmed over the tops of drab-colored weed thickets.

Stronger grew the illusions that he was seeing and swimming with the artificial eye. He fostered it deliberately, for he wanted the clearest of sight-impressions. He fancied himself sinking lower, lower, far out in the ocean and deeper than any diver had ever descended. He regretted the absence of strong light.

All around him darkness thickened, with only feeble radiance from an occasional deep-sea swimmer—a jellyfish with a dome that gleamed as if painted with phosphorus, a squat finny thing with a shining bulb on its head, a serpentine wriggler flecked with sparks of light like the ports of a tiny steamer.

Once he saw something blacker than the gloom, a shattered wreck half buried in the sandy bottom. Perhaps there was treasure in its coffers, but he did not stop to find out. Joel Dundonald had never coveted money.

HOURS passed. How far he had roamed with the artificial eye he could not guess—hundreds of miles, perhaps thousands. Upon his last drop toward the down-slanting bottom he was unable to see anything. The darkness of the under-ocean was so intense that it seemed to choke, to press upon the sight. He prepared to climb higher and get his bearings, but at that moment he caught a dull wash of light beneath.

Down he went at once, and down, like a plummet into some vague, unboundable valley of the submarine world. The light beneath grew stronger, clearer, until he made out its source. A thick bed of ooze gave off phosphorescence. He skimmed along above it, like a butterfly above a meadow.

Suddenly he paused, astounded and half unbelieving. What were those marks, two and two, in the shimmering layer?

They looked like—but no, impossible. No man could stand, much less walk, under the unthinkable pressure. Yet his sight reiterated what his mind rejected. Here was a trail of booted footprints, leading into the darkness. Had he, in rapt study of his own science, lost track of other achievements? Was diving armor now so perfect that men could invade this crushing depth?

He followed the tracks wonderingly, a floating bit of crystal that relayed its glimpses upward and back through the miles of water to where sat a gray-haired man among motors and gauges. That shore personality seemed far away now, unfamiliar and unreal. His spirit was literally in the abyss of ocean, grown one with the roving eye.

The meadow of ooze came to an end against a perpendicular cliff that rose into the upper darkness. As he approached this wall of stone, he saw that the trail led into the mouth of a cavern. His amazement and bafflement grew as he made out the marks of hacking tools upon this opening. It was the work of man—it could be nothing else. Far down the tunnel he could see a spot of brighter, warmer radiance. He plied toward it, through clear water, between smooth-chipped walls.

At length he could see into a larger cavern, well illuminated by a hanging lamp with myriads of bulbs, but into this he was unable to pass. After a

moment he realized that the eye, together with the water that surrounded it, was held back by a heavy transparent plate of glasslike substance. The chamber it fenced was empty of water. At a distance of several yards inside, the rocky walls and floor were grooved, while a recess in the ceiling showed where a second plate could slide down.

These plates, Dundonald conjectured, formed a lock. If the inner one descended and the outer one rose, objects could move inward along with a limited volume of water. The lowering of the outer plate and the lifting of the inner would make such an entry complete. This was the work of intelligent engineers.

Probably the cliff extended to the surface. Dundonald mused admiringly on the enterprise of men who burrowed down thus, then dared venture forth into the pressure-crushed underworld of the sea. He would give much to meet these fellow-scientists.

He waited long, close against the plate. Finally he gave up the tedious vigil, rose and shut off the power. It was an effort to make the transfer of identity from the gloomy depths to his own body in the house by the shore. Now it was night. Stretching his cramped limbs, he made his way to bed. The artificial eye, dropped in the mud at the threshold of that cave beneath the sea, would be carried inward whenever the lock opened. When he returned to his instrument, he might find something worth looking at.

He slept but poorly, and it was an hour before dawn when he was back at his instrument controls. Once more he switched on the power and, peering into the eyepieces, found himself back on the sea-bottom with the artificial eye.

AS he had hoped, the lock had been opened during his absence. His point of vision lay now in the midst of some slime on the inner floor. He raised it, letting the crystal idle in midair while he located several openings into other passages, all lighted and filled with air instead of water. Selecting one at random, he propelled himself down it.

Hooks on a wall supported strange, rigid garments of metal and an unknown fabric—diving armor of some sort, furnished with buoylike apparatus. Then hardy adventurers did pass through that lock, armored and held upright against the awful pressure. He sped on, burning with desire to learn more.

Sometimes the passage widened into a chamber which was stored with seaweeds, shellfish and other ocean denizens. Once he crossed another corridor, at the end of which showed blazing fires with little black figures tending them. A glassy plate kept him from investigating closer.

But the passages extended horizontally, not slanting upward. Did people live here permanently? What were they like?

He had barely passed the intersection before he found out. On the narrow floor lay a crumpled figure—a young man, dead. He wore a Grecian-looking tunic and his tawny beard was closely clipped. He had been stabbed through the body.

Studying the strange costume, Dundonald wondered more than ever. He raced the crystal eye onward. Before he knew, he was out of the passage and in a tremendous, high-vaulted chamber of rock, lighted by flames gushing through cracks in the ceiling. The floor was as wide as a parade-ground, and it was covered with dead.

Singly they lay, or two and three deep in piles. Some seemed quiet and peaceful, as if sleeping. Others had been thrown into violent postures and their faces—many bearded, like that of the first corpse—were distorted in death. Nearly every stiffened right hand clutched an axe, spear or short-sword. A battle had been fought here, and these were the casualties.

Roving here and there above the fallen men, Dundonald began slowly to accept the most amazing aspect of the entire adventure.

These were not inhabitants of Earth as he knew it. Their clothing and weapons were of another age and culture. Surely a lost nation lived and toiled and strove in these caverns. A

nation—he knew this at last—that never saw the surface.

Could such a thing be? It could. What of Mu and Atlantis? His fancy painted in swift, bold fashion a continent of the long ago, on which the sea rose hungrily. The desperate dwellers of that doomed land must have fled into caves, closing the way against the water. And there they had remained perforce, and their children after them, driven by necessity to develop scientifically new sources of food and water and air, until they knew no other life.

But why had these warriors fought and died? In dress, arms, appearance, they were as brothers. It must have been a civil war, over a trifle perhaps, in which opposing factions fought to a finish.

Dundonald soared across the corpse-strewn floor. At the mouth of a passage on the far side lounged two living men, apparently sentries. They leaned on their lances and conversed in voices he could not hear, neither noticing the crystal fragment that sailed overhead and into the tunnel they guarded.

Beyond was a new hall, a smaller replica, in shape, of the battle chamber.

It was filled with the living.

THE first figure to catch his attention was a great soft bulk upon a raised chair or throne. The face was hidden in black beard, save for two hard, bright eyes and a fierce hooked nose. A rich robe and gold rings on arms and brow proclaimed this individual for a ruler of some sort. Behind the dais ranged a rank of armed guards, extending the entire length of the hall. In front of the seated figure, hemmed in by more guards, stood three captives.

Two of them, a lovely, scantily clad girl with blond braids, and a tall, handsome youth whose cheek had been newly gashed, held tightly to each other with every appearance of loverly concern. The third, a powerful warrior with hairy chest bare, harangued the ruler. Dundonald could not hear, but he applauded the daring of the fellow who shook sinewy fists, struck his empty sword sheath and otherwise proclaimed his defiance.

The bearded one on the throne wagged a scornful head and drew his own keen short-sword. Carelessly he tossed it at the captive's feet.

The big man opened his mouth in what must have been a joyous shout. But as he stooped for the weapon, the ruler made a gesture of command. The guards sprang in. Before the luckless warrior could straighten and defend himself, he had been cut down and lay still, his blood soaking into the gravel at the throne's foot.

It was a craven trick, and even Dundonald's scientific serenity was outraged. The arrogant ruler now turned his attention to the two remaining prisoners. He held out a hand as if offering something.

The blond girl manifestly weighed the proposal. At length she took a slow step forward. The young man sprang to her side, catching her in his arms. His eyes blazed hate and scorn at their tormentor, and the girl wept.

It was plain, all plain, to Dundonald. The tyrant wanted her. He would spare her lover if she consented. Even now the gold-ringed arms rose in signal, and the guards dragged the prisoners apart. The young man struggled and struck, but they were too many for him. Again the bearded bulk on the throne put out his hand to beckon. The girl obeyed his gesture, but with lagging steps. Her face was white and sick.

A pudgy hand reached out to caress her bare arm. Loose lips parted in the dark beard, teeth glittered in triumph. The conqueror drew his prize to him, nuzzling her lovely pale cheek.

Dundonald felt a loathing absolutely strange to his calm and studious nature. He wished with sudden fervor that he were there in body, with a gun. The girl drew away from her unwelcome wooer. She held up her hands, lifted her eyes, praying as her ancestors must have prayed in the days when they could see the heavens and visualize a supreme arbiter there. Her tormentor only flung back his head to laugh. The guards flinched, as though his merriment were shocking sacrilege.

Dundonald had an inspiration. He focused on the scoffer's temple, just below the golden head-ring, and launched his crystal eye forward. It came to an abrupt, smacking halt that Dundonald could almost feel himself. For a moment all vision danced and blurred. Then, as he drew back, he saw that the gross body had reeled on the throne and that fat fingers rubbed the stung spot.

The guards had cowered at the seeming blow from an invisible enemy. But the man on the throne had coarse courage. He rose to his feet and made an uncouth, waddling step toward the girl. She was still praying.

Oh, for a gun, raged Dundonald; a gun, and a chance to drill that overbearing, sneering mask between the bright eyes. Whatever the fight had been, surely wrong had triumphed. This bearded lump of fat, actuated by cruelty and lust, even now pawing at the terrified girl—must he live to pollute Earth's caverns with his tyrannies?

Then Dundonald remembered that he had a weapon, a single crystal bullet, hard and swift. He had flicked the fellow once, had given him reason to pause. A second harder, fiercer stroke—should he try?

Sliding the crystal back to the uttermost corner of the hall, he focused again. The artificial eye hurtled forward at top speed.

Just as the pudgy hands subdued the struggles of the slender girl, just as the greedy eyes showed a fiercer light of joy, that hard little sphere drove home.

For the barest tithe of a second Dundonald saw red, the red of blood as his delicate bit of mechanism penetrated skin and flesh and bone. Then all went black.

HE sagged down in his chair, before the keyboard in his house by the sea. His machinery hummed no more. Somewhere down under the waves, his crystal eye, the triumph of his long labors, had struck with so great an impact that it had gone to pieces, jamming the entire system.

So his test ended. He had deliberately wrecked his own masterpiece, had lost forever its most important and valuable item.

Yet he had years of life left. He would begin again. Down in that sunken cavern a tyrant lay dead with a pierced skull. Two young lovers, freed by guards who quivered aghast at a miraculous answer to a seemingly vain prayer, were safe and joyful in each other's arms. Some day he, Dundonald, might send another crystal eye to visit them, to see their happiness and rejoice with them.

Dundonald smiled.

SCIENTIBOOK REVIEW

ANIMAL TREASURE. By Ivan T. Sanderson. Viking Press, New York. $3.50.

SCIENCE FICTION has taken to its heart the tradition begun by Stanley G. Weinbaum with his *Martian Odyssey* and carried on since his death by such writers as John W. Campbell, Jr.—namely the story of animals on other planets. There were unearthly animals before Weinbaum, but he was the first to make their insane habits an integral part of his stories.

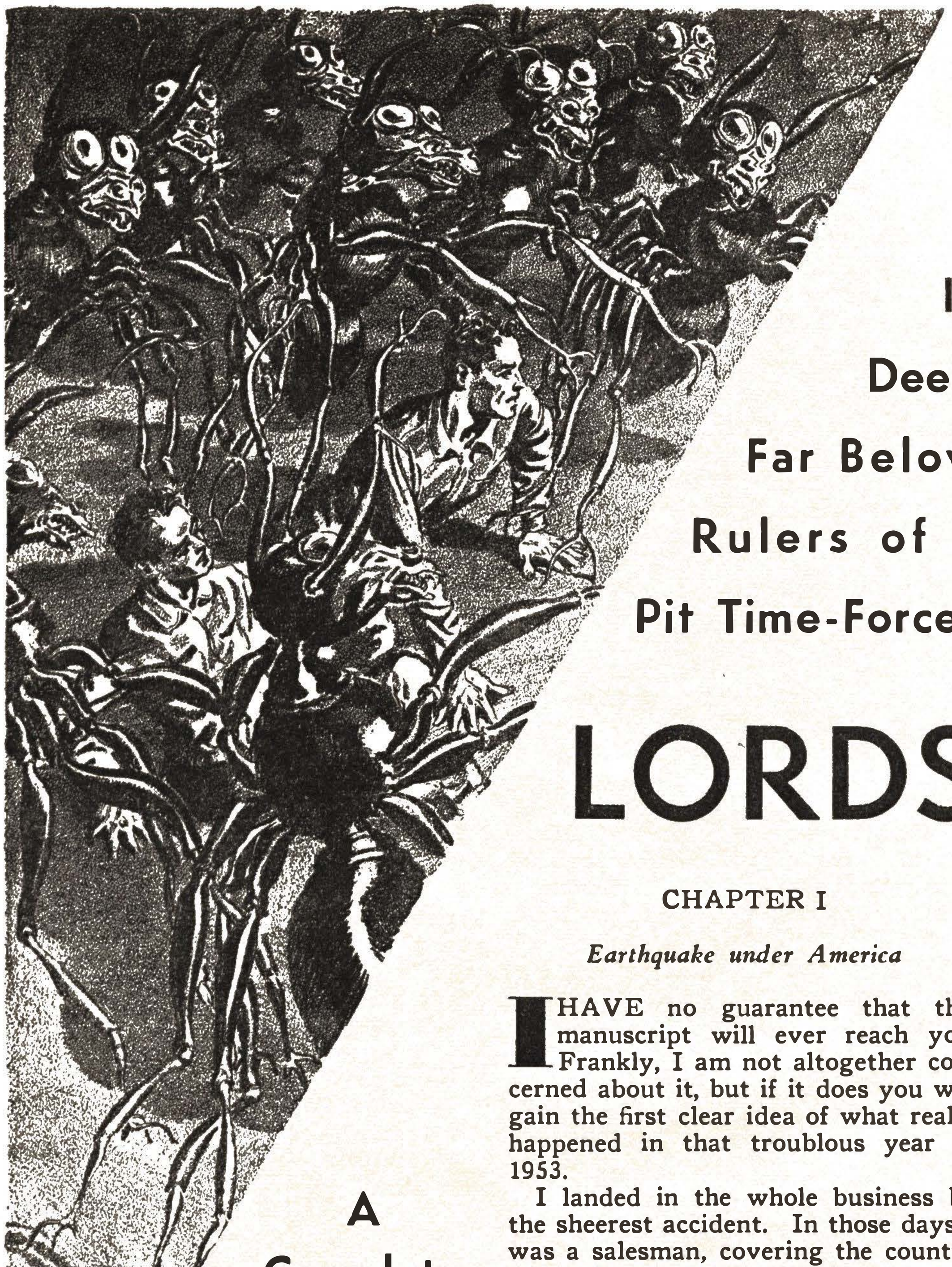
Be that as it may, there are animals on Earth just as weirdly unreasonable as anything science fiction has invented. Some of them are known by name to science; few of them are any more than names, plus mad tales that seem too outlandish to be true. In his *Animal Treasure*, Ivan Sanderson proves that they are true.

Animal Treasure is the story of an unorthodox expedition into the forests of West Africa to study some of these riddles of evolution.

Animals of all shapes and sizes crawl, climb and fly through the book's all too few pages. Imagine beasts of all shades of the rainbow, whose color is different by night and by day. Imagine frogs whose tadpoles frisk about in pools hot enough to cook an egg. Imagine two-inch mites that will attack a man. Dracula bats five feet across that even now have never been captured, creatures that can reverse their joints and crawl backward over their own chests.

Consider the pleasures of wandering around among the tops of trees, a hundred feet above the ground, in the dead of night and without a torch. *Animal Treasure* introduces you to all these and many more. It opens a wonderland of natural history as fantastic as anything in science fiction.

—P. S. M.



In Deep Far Below Rulers of a Pit Time-Forces

LORDS

A Complete Novelette of Insect Conquest

What I saw jolted me into life again

CHAPTER I

Earthquake under America

I HAVE no guarantee that this manuscript will ever reach you. Frankly, I am not altogether concerned about it, but if it does you will gain the first clear idea of what really happened in that troublous year of 1953.

I landed in the whole business by the sheerest accident. In those days I was a salesman, covering the country from New York to California, but one summer evening found me stranded, out of gas, five miles from the town of Dornford. There was nothing for me to do but to trudge.

I remember the scene clearly. Dornford was one of those straggling little places, a conglomeration of back to front shacks, one postoffice and filling station.

Even as I came over the brow of the hill leading into Dornford I felt sure there was something wrong. I can-

the Caves the Earth, Future Era Against Mankind of 9016

not explain why, but there was a conviction of strangeness in the air, a strong persuasion of unexpected things. The place didn't look right somehow.

Have your ever seen a place desolated by an unexpected and ruthless foe? Seen it lying, strangely, indefinably quiet, in a western sun? If so, you can understand how I felt when I saw Dornford.

My puzzlement deepened as I advanced. It was not the first time I had seen this particular town by any means, but it was certainly the first time I had ever seen it utterly deserted. There was not a living thing moving. Here and there automobiles were standing idle; others had obviously collided with fences and buildings and overturned. On the main street the garage was open. I went across to it, but on looking inside beheld work unfinished. A tire lay on the floor, semi-inflated; in a far corner a car was slung in the air on ancient block and tackle —but of people there was no sign!

By JOHN RUSSELL FEARN

Author of "Brain of Venus," "The Man Who Stopped the Dust," etc.

"Hey!" I yelled, cupping my hands. "Hello there! Everybody dead?"

But only my voice came back. Emerging again I stared out on the pasture fields. They were empty. A solitary hay-wagon, minus horse, had tipped forward with the animal's sudden removal.

I think I spent the remaining time until night in scouring what few open houses I could find, but there wasn't a trace of a living soul. It gave me the jitters, I must admit. Finally, I filled a can with gas, left payment on the bench, and returned to my car.

That, I say, is how the business started. I told police in the next village, Craytown, of what had occurred and they set off to investigate. Next morning the newspapers were full of the astounding occurrence. The mystery of Dornford had leaped into sudden and vivid prominence. The abrupt disappearance of some eight hundred people, together with animals, was undoubtedly front-page copy—and on arriving in New York two days later I found it was the main topic of conversation.

HAD the Dornford mystery remained in its unsatisfactory condition it would probably have been relegated to the world's unexplained mysteries.

But it wasn't allowed to die, for not a week later the amazing news was flashed all over America that the people of Craytown had also utterly disappeared!

In consequence, law officials and scientists gathered in their legions in the deserted towns of Dornford and Craytown, but not a trace of anything did they find. One of the scientists was Moore Ladbrook, an old college chum of mine, so upon his return to New York I made it my business to find out his views. Not that I am, or ever was, very scientific, but being so closely connected with the Dornford riddle my curiosity was naturally aroused.

I found Ladbrook at his home. Still in his early thirties he had already earned an enviable position for himself in the sphere of science, but even so it had not caused him to lose touch with less interesting people like myself. I found him as cordial as ever.

"Thought you were traveling, Dick," he said casually, offering me his cigarette case.

"Not at the moment," I told him. "I'm off the road for another week yet—vacation, you know. Frankly, I want your opinion on Dornford and Craytown."

"I wish I could give you one," he answered slowly. "Our investigations revealed no sign of anything living in either village, nor for miles around. Not even a trace of a struggle or strange footprints. That those people melted into thin air is well nigh inconceivable. I have dared to toy around with the idea of visitors from another world—carnivorous visitors, perhaps, but in that theory I'm hampered by the absence of any space machine.

"No one ever saw a ship approach the Earth. The only solution is that the invaders, granting there are any, have solved the secret of invisibility. I'm not at all satisfied with the investigations myself; in two days' time I'm examining the matter again, with special instruments. Maybe you'd care to join me?"

"Count me in," I nodded promptly, and drew on my cigarette as he went on theorizing in his clipped, matter-of-fact voice.

That same night, just when I was returning from Ladbrook's to my uptown apartment, the earthquake came. It arrived, if I remember rightly, at a quarter after eleven, the most unexpected ocurrence New York had ever witnessed.

I had been heading for a subway entrance when the disaster happened. The sidewalk seemed to rise up suddenly and hit me! I was hurled into the gutter with numbing force, twisted round.

I directed my gaze to a sudden amazing scene of toppling destruction.

New York rocked to its very depths. The taller buildings overbalanced and hurled their masonry with the force of shattering tons into the canyons of streets below. Roadways split in twain, swallowing up the yelling, stampeding people. Cars reeled and skidded

sideward into suddenly smoking gulfs. Amidst a rending and tearing of twisted, tortured steel an elevated hurtled clean off its riven track into the chaos beneath, turned itself into a mad, flaming ribbon of screaming death.

Windows cracked, fire leaped from warping, crumbling façades; subways sloughed and gulped downward in whirling vortices of sulphuric smoke. Trains themselves were smothered in the maw of inwardly hurtling rock and earth.

Ships in the harbor, seized in a smashing, inrushing tidal wave, splintered themselves to matchwood.

This ripple, this stupendous fault—as we then considered it—engulfed the entire continent, repatterned whole mountains, gave birth to new rivers and valleys, changed the entire topography of the United States in one overwhelming sweep. In twenty minutes of inconceivable convulsion America was reformed, recreated out of the shattering ear-splitting thunder of changing land.

I WAS caught up in the midst of a whirling mob of humanity, was punched and pounded helplessly before a battling, screaming flood. My ears were filled with the din of collapsing buildings, and subsiding earth; my eyes were blurred with clouds of dust and thickly rolling smoke.

Somehow, by an unknown mercy, I survived without undue mishap, found myself eventually in ruined, flaming Broadway, lending a hand in rescue work.

Throughout the long, hideous night I labored, carrying the dead and dying, moving wreckage, delving into smoky, scorching cavities, until at last a ragged dawn crept over the subsiding chaos and the survivors began to take stock of their infinitely changed and battered surroundings.

I need hardly record the fact that the almost total destruction of the American continent wrought world-wide havoc and repercussions, both elemental and financial. Everyone was alarmed, gravely concerned for his safety, so much so that the scientists suddenly came into public demand. Their investigations on the mystery of Dornford and Craytown were shelved—but not by Moore Ladbrook.

A week after the disaster I managed to trace him again. He had sought refuge with other scientists in the half demolished research offices of the Science Institute.

When I did find him he was in a grimly determined mood.

"Fools—all of them!" he declared flatly, pacing up and down the dust-smothered laboratory. "The other scientists are out searching for the cause of the fault that's ruined this continent. A fault, mind you! Good God, anybody with a grain of sense could see it was caused by some tremendous internal upheaval—the sudden removal of thousands of tons of solid matter; a repatterning of structure."

"But what caused it?" I insisted.

"Something living, something breathing—down below. People perhaps. Beasts of some sort." He came to a sudden halt, swung about on me. "In any case I'm going to find out while the others are fooling around with their earthquake equipment. You know perhaps that, two miles south of Dornford, there's a hole—a veritable crater—two miles across and of unknown depth?"

"I've heard of it," I nodded.

"Well, I'm going there—right now. Fortunately I've managed to secure a helicopter, have had it loaded with instruments and fitted with searchlights. I'm going down that hole, Dick! The others think I'm crazy. Perhaps they're right, but I'm going just the same. Care to come?"

I looked dubious.

"It's only a mile to the airport," he went on. "Either I'm crazy, or else I'm scientist enough to realize that some new form of life is at work under our very feet. You don't have to come—but I'd be glad to have you."

"I'll come," I said, not because I'm a brave man but because the idea gripped me with sudden fascination. Ladbrook merely nodded in that cursory way of his, snatched up his hat, and we set off together through crumbled, riven streets to the airport.

Half an hour later saw us streaking

westward in that powerful machine, Ladbrook the pilot. I noticed, with some doubts as to the future, that it was an entirely enclosed machine, hermetically sealed, air being supplied from some slightly hissing tanks in the rear.

"Never can tell what sort of poison gas is escaping out of that hell hole westward," he explained curtly, when I drew his attention to the matter. "It's emitting poisonous fumes same as all the rest of the volcanic craters. We'll be okay. We've gas helmets as well if necessary."

HE was damnably cheerful in the face of what looked like certain death to me.

I didn't say anything. I began to think I was a darned fool for agreeing with the idea anyhow.

I turned my eyes to the speeding landscape a thousand feet below, took in the twisted ground, the changed rivers, the flooded areas, the disrupted and toppled towns. The earthquake had certainly been a thorough and devastating piece of work. Sometimes we passed over scientific units, complete with equipment.

Invariably they drew snorts of rage from my friend.

"Fools! They imagine they can find the cause of an earthquake that's countrywide! If they'd consider the idea of unknown beings they'd get somewhere perhaps."

"Beings that sort of arrived from nowhere and cleaned up the inner surface?" I suggested acidly.

"They didn't arrive from nowhere; that's illogical. They came from somewhere very definite. We'll be seeing for ourselves before long."

He relapsed into silence again and nearly an hour later we beheld the smoking streak on the horizon that denoted our goal. My nerves began to tighten; I felt oddly like a man suddenly summoned to the electric chair. Casting a quick glance at Ladbrook I beheld his face set and carven, his eyes gazing steadily at his destination.

His fingers gently eased the controls that sent the fast moving plane down toward the disturbance.

CHAPTER II

Menace Below

THE actual area of the crater was rather indeterminable; the spewing sulphur clouds from its unimaginable depths rendered visibility feeble. Suddenly and completely the daylight left us and we went whirling into the midst of a yellow enigma, droplets of foul moisture clinging to the observation windows.

Ladbrook slowed the machine as we entered the area, brought the twin helicopter screws into commission and stopped our forward progress. With the slightest of jolts we began to drop slowly downward, engines throbbing with steady rhythm.

Ladbrook's brows knitted as he strove to see through the haze.

"Just a chance that all this discharge is from a riven upper strata," he said slowly. "That's what I'm counting on; below again may lie the very thing for which we're looking. Now hang on—we're going places."

He moved the controls again and our descent became speedier. I sat gripping my chair arms tenaciously, peering nervously into the murk. No trip through fog had ever been so nerve-racking. I was expecting solid ground below to rise up suddenly and hit us, pound us to wreckage. But no such thing happened.

Abruptly the murk cleared. We were left with absolute darkness—the velvet, sable darkness of a tomb.

Searchlights stabbed into the blackness, swirled automatically on their bearings to illumine a jetty emptiness, so wide, so expansive, that the very walls of the titanic shaft were invisible.

"Widens out as it goes down," Ladbrook muttered. "I was right about that volcanic stuff; it was only the upper strata cooling down after the gigantic land-slip. This part of the phenomenon was mechanically made, or I miss my mark."

"In so short a time?" I asked quickly.

"Not necessarily. This may have been going on for years, unknown, with

unimaginable machinery. Then suddenly something happened—there was an earthquake. Hello! Things are changing!"

In that he was correct. Our searchlights had at last focused on something solid—smooth, shining escarpments of rock, streaked with various strata; monstrous holes resembling tunnel mouths; gangways, ledges, cliffs—an entire gamut of strange and inexplicable things, a veritable honeycomb tunneled in iron-hard material.

"Though we're going down swiftly and have already dropped two miles, the external temperature remains the same as on the surface," Ladbrook remarked. That points to artificial cooling and ventilation. There's something big behind this. In fact—"

He stopped suddenly, and I ceased to listen. With a sudden violent jolt the helicopter landed upon something of tremendous hardness. I was hurled out of my seat, cannoned into the control board. Black waves of unconsciousness engulfed me even as I heard Ladbrook's shouting voice.

I think I was only unconscious a few moments. When I came to Ladbrook was standing over me, blood streaming from a cut on his forehead. Quickly he hauled me to my feet, shook me back to consciousness. His voice was grim as he spoke.

"Take a look at that," he ordered curtly, and pointed through the half shattered observation window. Holding my bruised forehead painfully I obeyed—then started violently at what I beheld.

It would have been a sensational sight on the surface; two miles below it was incredible.

The helicopter, utterly wrecked by the concussion, was reposing on a long gallery of rock stretching into invisible black remoteness. Below, however, an immeasurable distance, was a shifting mass of white lights, an immense and incredible sea of dots. Steady gazing revealed that the lights were not actually moving; it was the vibrations of the air currents producing the effect. In short, there was a city down there, a city of unknown formation, perhaps four or even five miles down.

I TURNED, and noticed Ladbrook's disheveled hair was blowing in the warm wind streaming through the smashed window. Warm wind? Down here? That confounded me more than ever.

"Come on," he said suddenly, and took down revolvers and cartridge belts from wall hooks. "Strap one of these on. We can't go back, so we've just got to go forward. Ready?"

I nodded and followed him through the opened airlock, trod warily on the slippery rock gallery on which I found myself. One miscalculation and I would have been hurled into that swirling enigma so far below. The very sight of it made me dizzy, but at least its reflected luminescence made our course faintly visible.

Ladbrook's flashlight snapped into life as we turned off into a side gallery, filled with a wind strongly reminding me of the subway in pre-earthquake New York. It smelled strongly of chemicals and electric discharges. About us, all around us, was the muffled thunder of buried machinery, conveying a suggestion of tremendous, unbelievable power.

The further we went the more complicated the tunnels became. One fact alone was obvious—they all led downward, and there were times when our progress was blocked by sheer pits descending into luminous, lambent depths below.

"Air shafts!" breathed Ladbrook, peering over as far as he dared. "Dick, I'm sure I'm right! Somehow—when, Lord knows—the earth has been tunneled out—just like a sponge. It's a veritable honeycomb—"

He stopped, pivoted swiftly as a slight sound fell on our ears. It was a groan! A profoundly deep groan. Our eyes moved simultaneously to an adjoining cavern opening. Cautiously, hardly daring to think what we might find, we advanced, peered within, the flashlight casting its penetrating beam on a grim sight.

The cavern was stacked with dead human beings—or if not dead very close to it! Have you ever seen an abattoir's storehouse stacked with carcasses? That was similar to what we

saw. But imagine the horror that coursed through us at beholding men, women and children of our own race, nude and blood-streaked, suspended from a long, glittering bar by viciously curved hooks.

Some were hung by the wrists, others by the feet, the barbs driven mercilessly through their flesh. It was from one of these unhappy beings that the groan had come—from a naked, elderly man. He hung suspended by his hands, gray-haired head lolling on his skinny chest.

Instantly we jumped forward to him, gripped him tightly between us and made a tremendous effort to raise him from his ghastly crucifixion—but in that we were beaten. The hooks went up too far; we were not tall enough.

"What in God's name has happened?" Ladbrook panted to him, forcing him to look up with tortured eyes. "What's going on here?"

"Creatures — insects —" the poor devil answered thickly, face wet with agonized sweat. "Spiders—or something. Meat for them—"

"We've got to get them out of here," I panted. "Our own people butchered and hung like—mutton! Moore, we must—"

I stopped, the words struck from my lips. Silently, unheard in the intensity of the moment, the immense arched doorway of the cavern had filled with creatures, or beings—or whatever the blasted horrors were. I simply couldn't speak. My eyes were fixed to them as they stood there plainly visible in the wavering light of Ladbrook's unsteady flashlight.

"God!" he whispered in a strangled voice. "Good God!"

THE faces of the things—there were six or eight of them—were extremely lengthy, narrow, and glistened like glazed chocolate. In the midst of this was a snoutish appendage, and on either side of it monstrous glaring eyes, compound eyes covered with a myriad, dully gleaming facets like those of a fly. The bodies, what we could see of them, were long, sloping downward to a point at the back, ending not a foot from the smooth cavern floor. The legs, covered in fine hair, terminated in viciously sharp clawlike appendages, the foremost ones almost resembling cruelly dangerous hands. Last of all came massive antennae, waving delicately in the warm, enervating breeze.

"Ants! Termites!" gasped Ladbrook's voice from the gloom. "Why in hell didn't I think of that before? Termites of vast proportions. Quick, man, we've got to move—"

His flash ceased to play on them as he jumped away into the shadows, but even as I dashed to follow him I realized how hopeless it was. In an instant I was overtaken by a pulpy yet unbelievably strong body, hurled to the floor, beheld glaring eyes above me glowing with strange lights. Then, to my surprise, all the life went out of me; I became completely passive, staring fixedly at a small instrument in the handlike appendage of my aggressor's front paw.

A mechanical instrument, something like a futuristic paralyzing ray envisioned by surface scientists, in the hand of an ant? The thing was surely impossible.

Unhappily, it wasn't impossible—far from it! Ladbrook and I, both unable to move or speak, became the witnesses of further unexpected incredible things on the part of our captors. We were removed from the cavern by an unknown process that caused us to float on the air, though my still active mind suspected a series of strong radio waves generated from a source unknown.

In this fashion, the termites behind us, we drifted down unearthly looking galleries, slid through softly lit caverns, dropped with the horrible sensations of a falling dream down what seemed infinite miles of shafting, until at last we came within visible range of that city we had first seen.

Still we drifted, coming ever nearer to that lambent haze, until quite suddenly it began to blur and distort like something seen through a curved mirror. Oddly, swiftly, it veered off into nowhere and was replaced by the gleaming interior of a tremendous hall, composed entirely of shining, crystalline metal.

The paralysis passed. Ladbrook and I found our faculties again, stood together watching. Behind us, now clearly visible in the strange pallor, loomed the termites, more hideous than ever. Before us, inexplicable and complex, were machines of almost translucent texture reflecting the unknown shadowless light in a million varieties of bewildering but lovely color.

We waited—and wondered.

CHAPTER III

Riana—9016

AT last, out of the haze of glory, there appeared another ant, similar in appearance to our captors save that he was slightly larger in size. He stood before us, glaring faceted eyes fixed upon us, his handlike tentacles reposing on a small, wheeled machine. Gently he moved a button; his thoughts came to us with a battering mental power, filled our brains immediately with his impression.

"You are only more fortunate than your fellows in escaping instant death because you, Ladbrook, happen to be the first scientist we have captured. Fortunately, the barrier of time and body makes no barrier to our communicating. With this machine your brain is rended plastic for my particular thought-vibrations. If you wish to reply, just speak; the concentration behind the words will be sufficient for me. I realize you are wondering about the strangeness of things?"

"Obviously you are ants—termites," Ladbrook said.

"Naturally. Not ants of your time, however, but the rulers of the year ninety-sixteen, seven thousand or so years ahead of you—time enough for the busy creatures of your present day to have evolved into the significant might you see we have. In this age of nineteen fifty-three you see the beginning in ninety-sixteen you have the pinnacle. There we are undisputed masters, lords of time, space and matter.

"Humans, petty and feeble, have almost stood still. We permit them to breed for only two reasons—one, because they sometimes have ideas that are useful to us, and the other because we need them as food, just as you breed cattle and kill them. Our evolution to this present immense size has made it necessary to change our early methods of eating the small things of life, common to this age, to taking the flesh and blood of warm-blooded living creatures. Human beings! That is why your humans on the surface disappeared. We stole them, to add to our waning supplies.

"We still have some of our own time with us, awaiting killing—but they are by no means enough. The beings above were brought here through the fourth dimension, through the very interstices of matter, which gave them free passage. In the same way you were merged into this city."

"Then you have been here long?" Ladbrook asked slowly.

"Ten of your years; we arrived in nineteen forty-three—carefully, cautiously, so you would suspect nothing. Aided by invisibility screens we set to work with our machinery. In ten years, with our knowledge, we have hollowed out this world right down to the central core of liquid nickel iron, supplying in the stead of the matter we destroyed an equipoise in weight by means of machines creating artificial gravitation.

"Recently one of these machines broke down and brought about the devastating havoc in your country. Otherwise you would not have been aware of our presence. Puzzled, perhaps—but nothing more. Your people would have continued to vanish and our slow conquest of this age would have gone on."

"If you are rulers of ninety-sixteen, why come back here?"

"For obvious reasons. Our own age has double its required amount of termite population; the creation machines have been very busy. We could kill half our number, of course, but being masters of Time we considered it better to come back to this age and hollow it out as we have our own, thereby es-

tablishing a second progressive insectile colony. Further, in our own age, there are not enough humans bred to satisfy all our numbers; here, the world is thick with them. They will make good fodder. That, my friends, is the explanation.

"And how do you come to be before your birth?" Ladbrook demanded. "That in itself defeats the law of Time."

"You will learn—if you live long enough, that is—that there are two states of Time; the one that is practical and the other that is abstract. In the latter condition it is possible to move in time just as you do in space. Actually, since time is a circle, we are not before our births but after our deaths. You understand?"

LADBROOK nodded vaguely.

"Not very well, I'm afraid. Am I to understand, then, that you intend to wipe out all the people on the surface of our world? Destroy humanity completely?"

"In due course—yes. And you two are not exceptions!"

With that the miniature paralyzers came into action again; once more the radio waves guided us helplessly through the profound and mysterious machine rooms of the termite city. At last we were permitted our faculties again within a grim looking apartment, hooks outjutting from its steel walls in a manner grimly reminiscent of the human storage cavern we had seen in the upper levels.

"Moore, they're not going to—" I began in horror, watching one of the insects pull down the hooks on a ratchet device.

"We'll try and make a dash for it," he answered quickly, glancing at the party of termites behind us. "We might make it. Come on—now!"

At that he jumped forward with me beside him, and with like speed the hideous insects closed in a grim circle, paralyzing beams flashing in the half light. I felt a sapping enervation at my nerves and muscles; my limbs turned to the consistency of water. Weakly I collapsed to the floor. Then, just as suddenly, the effect vanished. Surprised, I turned my eyes upward, and what I saw jolted me completely into life again.

Standing in the cavern doorway was a girl, the merest slip of a girl, lightly attired in a flowing costume that shone like cloth of gold. Her white arms were bare; her corn-colored hair dropped in rippling waves to her rounded shoulders. I think she was rather beautiful; I had hardly time to notice just then. I only glanced over the details of her set face, then my gaze rested on her small hand. Within it, held with rock-like steadiness, was a small but efficiently designed instrument. Evidently it possessed considerable power; the termites were already backing away with all the manifestations of uneasiness.

"What the ——" began Ladbrook in amazement, getting to his feet. "Say, Dick, what's that girl up to? Where'd she come from?"

"How should I know? I don't speak her language."

As I stopped speaking she beckoned us toward her. When we had gained her side she indicated that we were to follow. Slowly she withdrew, then began to run with most amazing speed, tirelssly, unerringly, through the complex and bewildering tunnels and caverns of the termite hill. On the way we passed one particular cavern that deeply impressed me, filled with gigantic electric machinery that utterly baffled my understanding.

"The artificial gravitators, I should think," Ladbrook puffed, as I drew his attention to them. "That's what they'll be. Wonder where this girl's heading for?"

Under her twisting turns, side-stepping movements, journeys down unexpected galleries, pursuit finally dropped away. We came to a breathless halt at last within a vast and gloomy cavern. She looked at us, smiling faintly to reveal regular white teeth.

"You talk my language?" she asked very quickly, and though it was English it was truncated and abbreviated in the oddest way as though speed were the main object.

"We're Americans—" Ladbrook be-

gan, and she interrupted him with a quick nod.

"I know—like the others in the storage rooms. I came from ninety-sixteen as fodder, along with many others. My name is Riana; I am the child of the human ruler of my age. I was captured by mistake before the termite exodus to this age; usually the high borns of the humans are left untouched. I have been here very long. Just now, when my termite guard fell asleep I managed to get his litholine gun from his belt—this."

SHE paused, indicated the instrument in her hand. "This is very deadly," she continued. "Changes matter into energy. I dissolved my prison door with it. On my way to escaping I came across you. Being humans I saved you. Now I have work to do. No time to lose."

"What's your plan?" I asked quickly.

"I have a scheme whereby I can release my race in ninety-sixteen. As you know, perhaps, the termites subject us. If we could only be free of them we would be lords of the world again. In ninety-sixteen there are five thousand termites left behind to guard the humans. Suppose one of their number came from here, called on those reserves, and emptied the underworld? Leaving the humans free? We could then start again and all the termites would be trapped in this age."

"But while they've got time machines and understand time travel they could always get back to ninety-sixteen," Ladbrook objected.

"But they don't understand time travel," Riana answered almost impatiently. "My father is the inventor of time travel; only he knows the real secret behind it, and he retains it in spite of termite threats. They don't dare do much to him because he is useful to them with his knowledge. If the machines here are destroyed the termites can never get back."

"And the human beings of this age?" I asked doubtfully.

"Humans here outnumber the termites by nearly three to one—I know that. Once the termites are trapped here I will see to it that my father provides the humans of your surface with machinery and weapons sufficiently powerful to wipe out this insectile colony. We could never do it in our own time; we must be rid of the ants first."

Ladbrook nodded slowly.

"Sounds O.K.; I'm with you, anyhow. But how do you propose to snare the ants from your age to this one? What ant is going to give the order for reserves?"

"I am," the girl answered simply. Then, as we stared at her, she motioned us to follow once again.

It became more than obvious as we went with Riana through the weird turmoils of that colossal termite world that she was working on a plan long prearranged.

We continued with speed, and yet caution, through galleries that were unknown to us but obviously familiar to her, until at last we emerged in a cavern stacked with all manner of strange machinery, illumined by a pulsing red light not unlike neon. Here we paused and Riana turned to us in that quick little fashion she had.

"See that?" And she pointed to a machine not entirely unlike an electric chair; electric bed would be a better simile. It was a long stretcher of crystalline substance with a queerly fashioned helmet at one end, from which snaked thick wires leading to generators and other quite unknown electrical equipment.

"Upon that lies my hopes," she went on rapidly. "Termites, as you may know, even in this age, are amazingly resourceful. Imagine, then, their powers in ninety-sixteen. When the body of one of their numbers, usually a neuter or worker ant, gets out of action or badly hurt, but the brain unimpaired, his entire brain is changed instantly to another termite carcass from which the brain has already been removed. The body, of course, has not withered; it is preserved in solution for untold ages, but the brain that formerly tenanted it has probably suffered irreparable injury and been destroyed.

"So, the instant change of brain from one body to another one provides that ant with a new body with which to carry on working. The process is en-

tirely by fourth-dimensional surgery. The brain is transferred without ever once coming into contact with anything material in transit—is simply rotated through hyper space to its new home. Every part of the operation is automatic, is accomplished by a movement of a master switch besides the stretcher table there. I happen to know; I've seen it at work thousands of times."

"Well?" asked Ladbrook tensely.

"In the next cavern are some five hundred termite bodies waiting to be used for brain transference in case of damage to any of the workers. The place isn't guarded; like everything else in this machine anthill it is automatically controlled. Besides, there is no need to guard it. I'm going to get one of those ant bodies and transfer my brain into it, afterward putting my own body in the same solution until I need it again.

"Thus, if in my own time I encounter other termites, which is more than likely, my real identity will not be known. My call for reinforcements will be apparently genuine. I know the termite telepathic language, of course—everything. Now do you see?"

"And us, if we come with you?" I asked quickly.

"You will come as my captives; leave me to arrange that."

"You're taking a terrific chance," Ladbrook muttered. "How do you know that your brain will link up properly with that of a termite body?"

Riana smiled a little. "I don't, but since the formation of an insect brain in ninety-sixteen is almost identical with a human's, I see no reason to anticipate failure. In any case I've got to try. Will you help me?"

CHAPTER IV

Shattered World

RIANA turned away quickly and we followed her into the adjoining cavern, removed with some difficulty the heavy body of a brainless neuter from an airtight cylinder of solution, dragged it along the floor to the specially designed trestles beside the complicated surgical bed.

Then Riana climbed onto the bed itself, lay down, and fitted the helmet into position on her head, afterward adjusting a complicated mechanism on the skull of the insect beside her. Once that was done her arm reached out and deflected the master switch of the amazing surgical instrument. From that instant onward we were the astonished observers of the most incredible surgery we had ever witnessed. Riana's young body relaxed gently under the anaesthetic automatically infused into her bloodstream. Her eyelids closed; her breathing stopped completely.

Still the clicking mechanism went on. Strange tubes began to glow oddly; ripples of violet light passed through inexplicable cylinders of transparent metal. Perhaps in all the operation lasted ten minutes, then the heavy, ugly body of the neuter ant began to twitch and vibrate. The surgical machine stopped. With heavy movements the ant dropped from the trestles.

"It can't be—" Ladbrook began, staring dazedly—but a moment afterward we were both forced into realizing that the miracle had happened. The girl's brain had been transferred, through a fourth-dimensional medium, into the ant's carcass. Now, though unable to speak, she explained most of her wishes by actions.

Her own limp, apparently dead body was swept off the table and placed in position in the solution cylinder that formerly held the ant. The whole thing, to me anyhow, was decidedly nightmarish. I was sure I was dreaming the whole nightmare as I lowered that slim form carefully into the strange substance—and I began to realize for the first time, as I held that body in my arms, that it had a decided attraction for me, even though it did belong to a girl seven thousand years ahead of me!

From that moment onward we continued our harrowing journey through the galleries, Ladbrook and I pretty well exhausted by the constant strain

of events and lack of food and rest—then our spirits began to rise somewhat at beholding ahead of us a fleet of some fifty cylindrical machines resting in an immense open space, guarded by two watchful neuters.

At that Riana—or rather the neuter carrying her brain—motioned us to go forward while she came behind, litholine gun held in her tentacle. Undoubtedly we looked captives all right, and evidently her communication with the guards satisfied them, too, for we were finally forced through the airlock of one of the gleaming, strangely designed machines and precipitated into the control room.

The airlock closed; Riana's insectile hands deflected the switches, and the view outside reeled away into a hazy mist of intervening Time.

Slowly we got to our feet. Riana the ant moved a machine forward, identical to the one the king termite had used. Under its influence her thoughts became appreciable to us.

"While this task is undertaken you will, as I explained before, remain apparently my prisoners. That is the only way in which I can explain away your presence. Leave the rest to me. In roughly thirty of your ordinary minutes the seven thousand year time gap will have passed. Say nothing—do nothing."

We nodded, and as she switched the machine off turned our attention to the windows, to behold nothing but the black opacity of intervening years.

I NEVER quite found out how the time machines worked, but what bit I did gather from Riana at a later date seemed to show that they utilized the principle of time, like space, being an eternal circle, divided only by a hypothetical blank time—hyper space. Electrical frequencies, governing this space, produced a connecting link between a past and future moment, producing finally a continuous movement forward instead of the sporadic advancement of normal time. In essence, the whole principle boiled down to utilizing that split second of *no* time, the eternal riddle of early science.

So finally the thirty minute interval passed away. The switches on the board reversed; before us there began to merge the most unexpected sight—of a city of white stone, carved in sheer blatant angles against a brilliantly blue and sunlit sky. There were ordered streets, uniform squares, beauteous fountains and trees—for all the world resembling a tropical city of immense and far reaching power.

"It is deceptive," Riana remarked, via the machine once more. "It looks as if it is the ruling city of the world—but it isn't. Though populated by humans, ruled over by my father, it is the creatures below who are the real masters."

She moved to one side after that observation, moved more switches with her clawlike hands. In consequence the machine, evidently equipped for ordinary air flight as well, began to travel swiftly toward the lower walks of the stupendous city, and after that down a spiraling shaft that sank into a pearly lit profundity.

FINALLY we left the shaft and dropped swiftly through complete emptiness, until at length there gradually spread out of the oyster-gray infinity an immense insectile colony almost similar to that existing back in 1953.

Without pause our time flying machine sped over the outermost galleries and ramifications of the expanse, halting at last within a gigantic cavern, containing nothing save one immense machine which even my untrained mind readily recognized as an infinitely perfected radio-transmitting device, some kind of major alarm machine, designed no doubt to send its message to the furthest corners of the incredible 9016 ant world.

To this, once the time machine had come to rest, Riana went instantly, flicked the controlling buttons with quick tentacle hands. It came into instant life, its massive generators humming powerfully. No sound came from Riana's rigid, antish form, but nevertheless other noises reached our ears—the deep, heavy rumbling of machines, the scrapings of myriads of insectile feet, the bustle of a world disturbed.

Then Riana abruptly changed the position of one of the control switches and there came into our minds a sudden impression of her thoughts.

"This shortens the telepathic wave length to the radius of this transmission cavern so you can understand me. I have issued orders to all termites, told them all to leave for nineteen fifty-three at once, that upon their getting there depends the very safety of their race. I think they will obey; once they are gone it means the safety of this age—indeed the conquest of the termite menace entirely. Then—"

The communication stopped. We turned and followed the direction of Riana's compound eyes, and started at what we saw. A gigantic male ant was in the entranceway, slowly advancing. As he came closer his thoughts began to be picked up by the still functioning machine and reflected back to us.

"So, it is a trick?" The intonation of the thoughts was malevolent. "You are no neuter—I recognize the trend of your thoughts. You are a human—a surface human—like these two here."

"I am a neuter, come to warn you of failure in nineteen fifty-three unless you all leave at once and reinforce our waning army," Riana replied, but there was tremor in her thoughts.

"Fortunate indeed that I projected myself here four-dimensionally," came the response. "You know me well enough—sub-ruler of this world until our master returns from his conquest of nineteen fifty-three. Your disguise does not fool me; the moment I heard your telepathic message I was dubious. You will die, and the humans too. As to the other termites, they will never leave this age. We will see whether you will gain the mastery by such a childish subterfuge."

"Get him!" snapped Ladbrook suddenly. "Quick, Dick! If we don't stop him the whole scheme flops! Quickly—"

He jumped forward with admirable courage to attack the monster ant, but the insect was by far the quicker. He neatly vaulted to one side, dodged Ladbrook completely, then clutched Riana. With devastating force he hurled her insectile body to the cavern floor. There came the horrible sound of cracking limbs under the onslaught, of powerful mandibles snapping hideously. Still in the machine's influence we could sense Riana's agonized thoughts. She was mortally injured—dying, her limbs broken and crushed.

The thunderings in the anthill mounted. Preparations were going on, would go on if we could only keep this over-suspicious insect out of the way.

I LUNGED forward, fingered unaccustomed switches, and snapped the telephatic-radiator out of being. A violent pull and a series of wires came out of it; at least that would stop his orders from being radiated. This I accomplished in perhaps two seconds. Then, consumed with overwhelming fury, I swung about and came to immediate grips with that messy, pulpy body.

In a moment I realized the impossible thing I had taken on. I was but a baby in the clutch of the terrible insect. It bent and twisted me effortlessly, hurled me to the floor with stunning, numbing force. Ladbrook leaped upwards too, intent on assisting me—then suddenly to my alarm he turned aside and raced for the time machine. For an instant I dared to think he was turning tail—but no! He returned almost immediately, bearing in his hand Riana's deadly litholine gun!

As I struggled even more weakly in the ant's merciless clutches I saw him fiddling irritably with the gun's peculiar mechanism—and suddenly it worked. A beam of green speared through the gloom. I felt the breath of an infinitely hot wind that scorched my face and singed my hair and eyebrows—but the pinioning grip fell away from me. Sickened and bruised I found myself lying beneath the dying remains of half the giant termite; he had been sawn in half as cleanly as if with a knife, the upper half containing his head radiated into instant energy.

"Quick!" Ladbrook shouted hoarsely, dragging me to my feet. "Before others come! Give me a hand with Riana!"

Between us we carried the limp

body of the neuter into the time machine, slammed the door and shot the clamps over. Then, using the telepathic machine as I had seen Riana do it I switched over the controls.

"Riana, how do we control this thing?" I asked urgently. Her thoughts, weak with pain from her shattered body, came back. While I supported her ugly, insectile head, held the machine near to her, Ladbrook followed out the orders she gave. Slowly and inevitably the year 9016 began to fade.

"I am dying," came Riana's thoughts again. "My—my brain is uninjured but this body is wrecked. You can save me only by getting my normal body back to me. You saw what I did; simply repeat the operation, but remember that my body goes on the trestles this time instead of the bed. If you are caught it means the end—of everything. Remember, you've got to succeed! For the sake of humanity you must!"

With that the unconsciousness of near-death claimed her. I lowered the body back to the floor, stood beside Ladbrook and aided him as well as I could to control the machine from the whispered instructions that had been given us.

We managed fairly well until the dials revealed we were around 1953. Then we experienced difficulties. We lost over four hours of valuable time trying to hit the right second that would give us entry into the right period, that would permit us to take up the thread in proper sequence without repeating anything already done.

"Better take a chance!" I said at last, worriedly. "We'll never do it otherwise."

Ladbrook n o o d e d grimly and slammed the switches home, brought about an instant halt. It seemed in that moment that the entire Universe came to an end. Outside, there was a terrific explosion, a rending and thunderous concussion that set the time machine bounding up and down with the force of tremendous reverberation. It was minutes before the disturbance finally settled down and we dared to unlock the airlock and climb out. The instant we did so we stood asounded at the amazing sight that met our eyes.

UPON every hand were riven, shattered machines—monster engines of power that were racing themselves to destruction. But that was not all. Below lay the city, swarming with the hurrying forms of the termites, all of them struggling and heading directly toward the over-jammed time machine grounds. It was obvious that vast numbers had already arrived from 9016, probably in our four hour delay. And even as they ran we beheld vast mounds of earth falling inward, solid walls of rock caving in and collapsing with thunderous concussions.

"Good heavens, I get it!" Ladbrook panted hoarsely, wheeling about. "The time machine moved in space at the other end, when we went to the city and then to the termite colonies below it. That caused it to move the same distance here, of course. When we came back we merged *inside* one of the enormous gravitational machines used for supporting the surface! We destroyed it, burst it outward. The power has gone and thrown the force onto the other machines. They can't cope with it, hence the surface is slowly collapsing. Don't you recognize this place again?"

I nodded quickly.

"Does this mean the whole world is crumbling?"

"Nothing else but—steadily and inevitably. Fortunately the beams from these things are diagonal; that means our part will hold a little while before it caves in. We've got to get to that operating room with Riana. It's straight ahead, then left, right and left, if I remember. Come on!"

So, carrying Riana, we began our desperate struggle, fighting against time and earth-collapse. Fortunately the ants were all in the lower galleries, heading for the time-grounds, obviously well aware of what had happened. In this we were lucky; had they come across our time machine we would have been in a ghastly predicament.

Several times on the trip we missed

our way, had to retrace our path through the midst of occasionally falling lumps of the upper gallery—then ultimately we hit upon the operating room, dumped the dead body of the neuter ant on the electric bed and headed for the storage room.

In the space of a few moments, while the walls creaked and groaned and fissured about us, we withdrew Riana's own body from its glutinous preserving solution, dumped it on the adjoining trestles, strapped on the helmet and adjusted the mechanism to the head of the termite. Then the depression of the master-switch—

Never have I known such hellish moments. The earth was shaking madly, crumbling and roaring around us. As the four dimensional surgery began I tried to imagine what was happening on the surface. The world was ruined, humanity destroyed for the greater part—yet it was possible there would be survivors. More than possible—certain! The existence of humanity in future time was proof of that!

"In Heaven's name, how much longer?" Ladbrook groaned, and looked round in alarm at the sudden collapse of a portion of the heavy rock ceiling.

When he had swung back from gazing at it the girl was making slow motions at recovery. We didn't wait any longer. Whipping the mechanism from her head we snatched her up between us and pelted through the fast crumbling passages. Even as our time machine at last loomed in view there was seared into my brain an unforgettable sight—a vision of landscape and oceans of the upper world hurtling inward into the shattered earth.

Mud, sea water, rain, dust and rocks were tumbling through the air as we flung the airlock back, hurled Riana and ourselves within the time machine. Even as I jumped to the switches and closed them the complete mass of the surface subsided inward in a vast and overwhelming cataclysm.

Then peace. We were in future time, heading steadily toward 9016.

I HAVE told my story. When we finally landed in 9016 we discovered that some of the time machines of 1953 had escaped the disaster and got back, but the numbers of termites to surface humans were comparatively few and Vanzax, Riana's patriarchal looking father, had taken the opportunity to reassert his powers and take possession of the entire world.

Reading over my history records I find that the Earth was utterly changed in that vast upheaval of 1953. For one thing, its mass was decreased by a fifth—all of the matter of the interior having, of course, been changed into energy by the termites. This, compensated by their artificial gravity controllers, was missing when they were destroyed. This fifth in difference is still visible in this world of 9016; the earth is considerably smaller, a fact I did not have time to notice on that other excursion.

Humans of 1953 did survive in places. Some three thousand remained, patterning their lives anew on a smaller world.

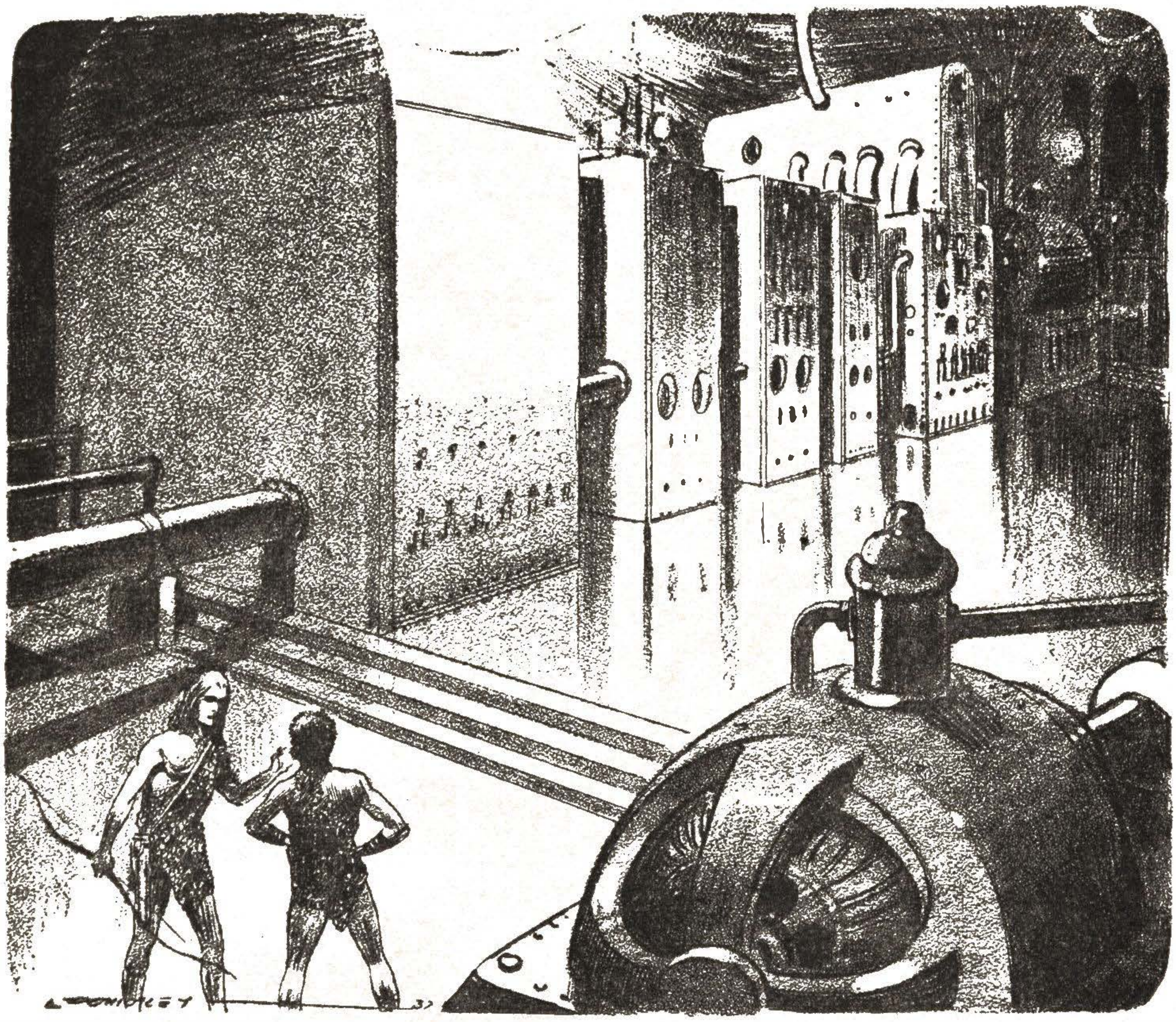
As to this age, the remaining termites have not been allowed to breed; all save neuters have been exterminated, and these sexless insects are entirely workers under the humans' commands, the underworld being used for the storage of scientific machines.

Ladbrook is a scientist still—and a very happy one, and I am his assistant. We are the only survivors of 1953 to be projected by sheer circumstance seven thousand years ahead of our time. This story I am sending to an era before the invasion came, way back into the remote ages between 1938 and 1940. Somewhere there the little automatic time machine I send may arrive. I hope so, so that you may know what is to come and prepare—if that is possible.

For myself I am happy—blissfully happy in this divine city. Besides, Riana is my wife now, and no man, of any age, could wish for one more loving, more clever, or more beautiful than she.

Next Issue: MURDER IN THE VOID, by Edmond Hamilton

THE DARK AGE



The place was crowded with intricate machines

Man's Last Fortress of Science Towered High and Alone— Guarded by a Zone of Deadly Force!

By CLARK ASHTON SMITH

Author of "City of Singing Flame," "Beyond the Singing Flame," etc.

THE laboratory was like a citadel. It stood on a steep eminence, overtopped only by the loftier mountains. They who had built the laboratory, in the years when Earth's loftiest civilization was crumbling swiftly, had designed it for a fortress of science, in which something of man's lore and wisdom should be preserved throughout the long descent into barbaric night.

The walls were of squared boulders from a glacial moraine; and the woodwork was of mountain cedar, mightily beamed as that which was used in Solomon's temple. High above the main edifice there soared an observatory tower, from which the heavens and the surrounding lands could be watched with equal facility.

The hill-top had been cleared of pine and fir. Behind the building there were sheer cliffs that forbade approach; and all around it a zone of repellent force, which could be made lethally destructive if desired, was maintained by ma-

chines that conserved the solar radiations and turned them into electricity.

The dwellers in the laboratory looked upon themselves as the priests of a sacred trust. They called themselves the Custodians. In the beginning they had numbered eight couples, men and women of the highest ability and attainment, specializing in all the main branches of science. They had withdrawn to this secluded place from a world ravaged by universal war, famine and disease, in which all other scientists and technicians were doomed to perish.

The region about the laboratory was, at that time, unpeopled; and the building, reared with utmost secrecy, escaped destruction in the warfare that wiped out whole cities and covered great empires with low-lying clouds of death.

Later, into the hills and valleys below the laboratory, there came a wretched remnant of city-dwellers from the plain. With these people, already brutalized by their sufferings and hardships, the handful of scientists held little commerce.

Over a course of generations, the Custodians, intermarrying, decreased gradually in number through sterility; while the other fugitives multiplied, reverting more and more to a state of barbarism, and retaining only as a dim tribal legend the memory of the civilization from which they had fallen.

Living in mountain caves, or rude huts, hunting the forest animals with crudely made spears and bows, they lost all vestige of the high knowledge and mastery over nature possessed by their forefathers. They understood no longer the machines that rusted in the rotting cities. Through a sort of atavistic animism, they began to worship the elements that their fathers had subdued and controlled.

At first they tried to assail the laboratory, impelled by a savage lust for loot and bloodshed; but, driven back with dire loss by the zone of deadly force, they soon abandoned their siege. In time they came to regard the Custodians as actual demi-gods, wielding mysterious, awful powers, and working incomprehensible miracles. Few of them now dared to approach the environs of the building.

Then, from the dreadful house on the height there came down one morning a single Custodian. He bore no weapon but carried an armful of heavy books. Approaching a small village of the tribesmen he raised his right hand in the universal gesture of peace.

Speaking a language they could hardly understand, he told them that he had come to live among them. His name was Atullos. By degrees he won their confidence; and afterward he mated with a woman of the tribe. Like Prometheus, bringer of fire to ancient mankind, he sought to enlighten these savages.

He undertook to reproduce for their benefit some of the inventions preserved in the laboratory. He told them nothing of his real reasons for leaving the other Custodians, with whom he had held no communication since joining the hill-people.

Atullos had brought with him no other equipment than his few books. For lack of even the most rudimentary tools and materials, his scientific labors were fraught with immense difficulty. The savages, in their reversion, had lost even the knowledge of metals. Their weapons were those of the Stone Age; their plough-shares crooked sticks of fire-hardened wood.

Atullos was compelled to spend whole years in mining and smelting the ores that he required for his tools and machines; and he even made long, hazardous journeys to obtain a supply of certain elements lacking in that region. From one of these journeys he failed to return; and it was believed that he had been slain by the warriors of a hostile tribe upon whose territory he had intruded in his search.

HE left behind him one child, the boy Torquane, whose mother had died shortly after the child's birth. Also, as a legacy to the tribe, he left a few tools of copper and iron, in whose forging he had instructed some of the more intelligent men. The machines on which he had labored with such pain and patience were only half completed; and following his disappear-

ance, no one was competent to finish them.

They were designed for the development of electric power, and the use and control of certain cosmic radiations; but the tribesmen who had assisted Atullos knew nothing of their purpose and the principles involved.

Atullos had meant to instruct his son Torquane in all the lore of the Custodians; and thus the elder sciences, conserved so jealously by a few, might again have become in time the heritage of all mankind. Torquane had reached the age of four when Atullos vanished; and he had learned no more than the alphabet and a few simple rules of arithmetic.

For lack of his father's guidance, this rudimentary knowledge was of little use to him; and, though naturally precocious and brilliant beyond his age, he could not continue for himself the education that Atullos had begun.

In the soul of Torquane, however, as he grew to manhood among primitive companions, there burned the spark of a restless aspiration, an inherited craving for knowledge, that set him apart from the others.

He remembered more of his father than most children recall when deprived of the parent at so early an age; and he learned from his fellows that Atullos had been one of the Custodians, who were looked upon by the tribe as beings with divine powers and attributes.

It was commonly believed that the Custodians had banished Atullos from their midst because of his desire to help and enlighten the hill-people. Slowly, as his mind matured, there came to Torquane an understanding of the altruistic aims of his father, who had dreamed of restoring the old sciences in a darkened world.

Torquane lived the rude life of the tribesmen, hunting the hare, the boar and the deer, and climbing the precipitous crags and mountains. Excelling in all barbarous sports, he became very hardy and self-reliant. Outwardly he differed little from the other lads, except for his fairer skin and straighter features, and the dreaminess that filmed his bright eyes on occasion.

Often, as he grew older, his thoughts turned to the mystery of that high and guarded citadel from which his father had come down to join the tribesmen. Knowing his kinship to the Custodians, Torquane wondered much concerning them. A strange curiosity drew him again and again to the hills below the laboratory. From such viewpoints, however, he could see nothing of the occupants or their activities. All was still and silent, and this very stillness, by degrees, emboldened the boy and drew him nearer to the dreaded eyrie.

Using all his stealth of woodcraft, and treading with utmost care lest a leaf or twig should crackle beneath him, he climbed one day the steep, heavily forested slope toward the building. Breathless with awe and apprehension, he peered at last from behind the bole of a gnarly pine that grew just beyond the verge of the laboratory grounds.

GRIM, repellent, fortresslike, the rectilinear walls and square towers bulked above him against a heaven of light clouds. The windows glimmered blankly, withholding all their secrets. In the building's front an open doorway arched, beyond which, in silver flashes, Torquane discerned the leaping of fountains amid a sunlit court.

Sapling firs and pines had begun to invade the level, cleared area of the grounds. Some of them were already shoulder-high. Amid these miniature thickets Torquane heard a vengeful humming that might have been made by some invisible throng of bees.

The sound maintained always the same position, the same pitch. Peering closely, he saw that there was a yard-wide line of bare, vacant soil running like a path amid the young conifers, and following the apparent course of the sound. This line, he knew suddenly, betokened the force-barrier beyond which no man could pass; and the humming was the noise made by the repellent, lethal power.

Much of the area between the saplings and the laboratory was filled with rows of vegetables; and there was also

a small flower garden. The place bore evidence of careful tending and had been watered recently; but no one was in sight at the time. In the building itself, as Torquane stared and listened, there began a sonorous iron throbbing whose cause, in his complete ignorance of machinery, he could not imagine. Alarmed by the loudening noise, which seemed full of mysterious menace, Torquane fled on the wooded slope, and did not venture to return for many days.

Curiosity, and some emotion deeper than curiosity, whose nature and origin he could not have defined, impelled him to revisit the place in spite of his vague, half-superstitious fears and intuitions of danger.

Peering, as before, from the shelter of the ancient pines, he beheld for the first time one of the building's occupants. At a distance of no more than twenty yards from his hiding place, a girl was stooping above the violets and pansies in the trimly plotted flower garden.

Torquane thought that he gazed upon a goddess: for, among all the village girls, there was none half so lovely and graceful as this incredible being. Clad in a gown of light April green, her hair falling in a luminous yellow cloud about her shoulders, she seemed to cast a brightness on the flowers as she moved among them.

Drawn by a strange fascination such as he had never before experienced, the boy leaned from behind the sheltering pine, forgetful of his fears, and unconscious that he was exposing himself to view. Only when the girl happened to glance toward him, and gave a low, startled cry as her eyes met his, did he realize the indiscretion into which he had been betrayed.

Torquane was torn between the impulse of flight and a strong, unreasoned attraction that made him unwilling to go. This girl, he knew, was one of the Custodians; and the Custodians were demigods who wished no association with men. Yet, through his father, he was able to claim kinship with these lofty beings.

And the girl was so beautiful, and her eyes, meeting his across the flower-plot, were so kind and gentle in spite of their startlement, that he ceased to apprehend the instant doom that his daring might perhaps have earned. Surely, even if he remained and spoke to her, she would not loose against him the dreadful lightning of the Custodians.

RAISING his hand in a gesture of placation, he stepped forward among the seedling conifers, stopping only when he neared the vicious humming of the invisible force-barrier. The girl watched him with amazement, her eyes widening, and her face paling and then reddening as she grew aware of Torquane's comeliness and the undisguised ardor of his gaze.

For a moment it seemed that she would turn and leave the garden. Then, as if she had conquered her hesitancy, she came a little nearer to the barrier.

"You must go away," she said, in words that differed somewhat from those of the dialect familiar to Torquane. But he understood the words and to him their strangeness savored of divinity. Ignoring the warning, he stood like one enchanted.

"Go quickly," said the girl, a sharper note in her voice. "Barbarians should not come here."

"But I am not a barbarian," said Torquane proudly. "I am the son of Atullos, the Custodian. My name is Torquane. Can we not be friends?"

The girl was plainly surprised and perturbed. At the mention of Atullos' name, a shadow darkened her eyes; and behind the shadow an obscure terror seemed to lurk.

"No, no," she insisted. "It is impossible. You must not come here again. If my father knew—"

At that instant the humming of the barrier deepened, loud and angry as the buzzing of a million wasps, and Torquane felt in his flesh an electric tingling, such as he had felt during violent thunderstorms. All at once the air was lined with sparks and bright fiery threads, and was swept by a wave of ardent heat. Before Torquane the little pines and firs appeared to wither swiftly, and some of them leaped into sudden flame.

"Go! Go!" he heard the crying of the girl, as he fell back before the moving barrier. She fled toward the laboratory, looking back over her shoulder as she went. Torquane, half blinded by the waving webs of fire, saw that a man had appeared in the portals, as if coming to meet her. The man was old and white-bearded, and his face was stern as that of some irate deity.

Torquane knew that this being had perceived his presence. His fate would be that of the seared saplings if he lingered. Again a superstitious terror rose within him, and he ran swiftly into the sheltering gloom of the ancient forest.

Heretofore Torquane had known only the aimless longings of adolescence. He had cared little for any of the savage though often not uncomely maidens of the hill-people. Doubtless he would have chosen one of them in time; but, having seen the fair daughter of the Custodian, he thought only of her, and his heart became filled with a turmoil of passion that was all the wilder because of its apparent hopelessness.

Proud and reticent by nature, he concealed this love from his companions, who wondered somewhat at his gloomy moods and the fits of idleness that alternated with feverish toil and sport.

Sometimes he would sit for whole days in a deep study, contemplating the machines and volumes of Atullos; sometimes he would lead the younger men in the chase of some dangerous animal, risking his own life with a madder disregard than ever before. And often he would absent himself on lonely expeditions that he never explained to the others.

THESE expeditions were always to the region about the laboratory. For a youth of Torquane's ardor and courage, the peril of such visits became an excitant rather than a deterrent. He was careful, however, to keep himself hidden from view; and he maintained a respectful distance from the humming barrier.

Often he saw the girl as she moved about her garden labors, tending the blossoms and vegetables; and he fed his desperate longing on such glimpses and dreamed wildly of carrying her away by force, or of making himself the master of the laboratory.

He suspected, shrewly, that the Custodians were few in number, since he had seen only the girl and the old man who was probably her father. But it did not occur to him that these two were the sole tenants of the massive citadel.

It seemed to Torquane, pondering with a lover's logic, that the girl had not disliked him. She had warned him to go away, had called him a barbarian. Nevertheless he felt that she had not been offended by his presumption in accosting her. He was sure that he could win her love if given the opportunity.

Mating with a daughter of the Custodians, he would win admittance to that world of light and knowledge from which his father had come; that world which had tantalized his dreams. Tirelessly he schemed and plotted, trying to devise a way in which he could pass the force-barrier, or could communicate with the girl without bringing upon himself the Custodians' anger.

Once, by moonlight, he attempted to climb the cliffs behind the laboratory, working his way hazardously from coign to coign. He abandoned the attempt only when he came to an overhanging wall of rock that was smooth as beaten metal.

There came the day when Torquane, revisiting the woods that pressed close to the laboratory garden, grew aware of an unwonted silence weighing oppressively upon all things. For a few instants he was puzzled, failing to comprehend the cause. Then he realized that the silence was due to a cessation of that humming noise which had signalized the presence of the barrier.

The grounds were deserted, and, for the first time, the building's heavy cedarn portals had been closed. Nowhere was there any sound or visual sign of human occupation.

For awhile Torquane was suspici-

ous, apprehending a trap with the instinct of a wild creature. Knowing nothing of machinery, it did not occur to him that the repellent power had failed through the wearing out of its hidden generators. Perplexed and wondering, he waited for hours, hoping to catch a glimpse of the girl. But the garden remained empty, and no one opened the frowning portals.

Alert and vigilant, the boy still watched. The forest's afternoon shadows began to lengthen, invading the laboratory grounds. Screaming harshly, a mountain blue-jay flashed from the pine above Torquane, and flew unharmed across the area that the lethal screen had formerly barred to all ingress of living things.

An inquisitive squirrel raced among the saplings, over the bare path of the barrier, and chittered impudently in a plot of young corn and beans. Half incredulous, Torquane knew that the barrier was gone; but still his caution prevailed, and he went away at last.

"VARIA, we cannot repair the generators," said the aged Phabar to his daughter. "The work is beyond my strength or yours. Also, metals are required which we cannot procure in their native state, and can no longer make with the weakening atomic transformers. Sooner or later the savages will learn that the force-barrier has ceased to exist. They will attack the laboratory—and will find only an old man and a girl to oppose them.

"The end draws near, for in any case I have not long to live. Alas! If there were only some younger man to assist me in my labors, and in defending the laboratory—some worthy and well-trained youth to whose care I could leave you, and could leave our heritage of science! But I am the last of the Custodians—and soon the darkness into which mankind has fallen will be complete, and none will remember the ancient knowledge."

"What of that boy who calls himself the son of Atullos?" ventured Varia timidly. "I am sure he is intelligent; and he would learn quickly if you were to receive him into the laboratory."

"Never!" cried Phabar, his quavering voice grown loud and deep with an old anger. "He is a mere savage, like the rest of mankind—and I would rather receive a wild beast than the progeny of the false Atullos—that Atullos whom I drove from the laboratory because of his evil passion for your mother. One would think you were enamored of this young forest wolf. Speak not of him again."

He glared suspiciously at the girl, the rancor of unquenched enmity and jealousy toward Atullos glowing in his sunken eyes, and then turned with palsy-shaken fingers to the test-tubes and retorts among which he was still wont to busy himself in pottering experiments.

Torquane, returning the next day, verified his discovery of the barrier's failure. He could now approach the building if he wished, without peril of being blasted from existence at the first step. Boldly he went forward into the gardens and followed a little path that led to the shut portals. Coming in plain view of the windows, he laid his bow and arrows on the ground as a token of his peaceful intent.

When he neared the portals, a man appeared on one of the high towers and trained downward a long metal tube revolving on a pivot. It was the old man he had seen before. From the tube's mouth there leaped in swift succession a number of little shafts of silent flame that played around Torquane and blackened the soil and flower-beds wherever they struck. Phabar's aim was uncertain, due to his aging eyesight and trembling hands, for none of the fire-bolts found its mark. Torquane went away, concluding that his overtures were still undesired by the Custodians.

As he entered the woods below the laboratory, he was startled by a human shape that drew back stealthily into the shadows. It was the first time he had seen anyone lurking in that century-shunned locality.

In that brief glimpse, Torquane knew the man for a stranger. He wore no garment except a wolf-skin, and carried for weapon only a rude spear tipped with flint. His features were

brutal and degraded, and his forehead was striped with red and yellow earths, identifying him as a member of that extremely degenerate tribe which was believed to have slain Torquane's father.

Torquane hailed the man but received no answer other than the crackling of twigs and the sound of running footsteps. He sent an arrow after the intruder, and lost sight of him among the tree-trunks before he could notch a second arrow to the string. Feeling that the man's presence boded no good to the Custodians or to his own people, he followed for some distance, trailing the stranger easily but failing to overtake him.

Disturbed and uneasy, he returned to the village. After that, for long hours daily, and sometimes by night, he watched the hills about the laboratory, glimpsing more than once the strange tribesman together with others plainly of the same clan. These savages were very furtive, and in spite of all his woodcraft they avoided any direct encounter with Torquane.

It became manifest that the laboratory was the center of their interest, since he found them lurking always somewhere in its neighborhood. From day to day their numbers increased; and Torquane soon conceived the idea that they were planning an attack upon the building. Henceforth the torments of his baffled love became mingled with fears for the safety of its object.

He had kept this love and his trips and vigils secret from his comrades. Now, calling together the young men and boys who acknowledged him as their leader, he told them all that he had experienced and observed. Some, learning that the force-barrier was dead, urged an immediate assault upon the laboratory, and promised Torquane their assistance in capturing the girl. Torquane, however, shook his head.

"A deed such as this would ill become the son of Atullos," he said. "I will take no woman against her will. Rather would I have you aid me in protecting the Custodians, who are now few and feeble, against the marauding of this alien tribe."

Torquane's followers were no less willing to fight the intruders than to assail the laboratory. Indeed, the alien clansmen were regarded as natural foes; and their slaying of Atullos had not been forgotten. When it became generally known that they were lurking about the laboratory, many of the tribe's older warriors pledged assistance to Torquane in repelling them; and the youth soon found himself the leader of a small army.

SCOUTS were sent out to watch closely the movements of the foreigners, who had grown bolder with daily reenforcements. At midnight some of the scouts reported that they were gathering on the slope below the laboratory. Their exact number was hard to determine because of the thick forest.

Some of them had been seen stripping a fallen pine of its boughs with stone axes; and it seemed plain that the attack was imminent, and that the pine would be used as a sort of battering-ram to break in the portals.

Torquane immediately marshaled his entire force, numbering close to a hundred men and boys. They were armed with copper knives or spears, well-seasoned oak or dogwood bows, and quivers filled with copper-tipped arrows. In addition to his own bow and knife, Torquane carried with much caution a small earthen jar filled with a gray powder, which he had taken from Atullos' workshop.

Years before during his boyhood, prompted by a spirited of crude experimentation, he had dropped a pinch of this powder upon a bed of coals, and had been startled by the loud explosion that resulted. After that, realizing his complete ignorance of such matters, he had feared to experiment with any more of the chemicals prepared and stored by his father. Now, recalling the powder's properties, it occurred to him that he might make an effective use of it in the battle against the invaders.

Marching with all possible speed, the little army reached in an hour the

starlit height on which stood the laboratory's dark mass. The wooded slope was apparently clear of the alien savages who had swarmed upon it earlier that night; and Torquane began to fear that they had already captured the building.

HOWEVER, when he and his men emerged from the forest on the edge of the gardens, they saw that the attack had just begun. The grounds swarmed with stealthy, silent, shapes, dimly discernible, who moved with a concerted surging toward the still and unlit edifice.

It was as if an army of shadows had beleaguered a phantom fortress. Then the eerie silence was shattered by a loud crashing, together with an outburst of ferocious howlings from the savages.

Torquane and his followers, rushing forward, saw the center of the dark horde surge backward a little. They knew that the battering-ram had failed to break in the cedar portals at its first impact and was being withdrawn for a second attempt.

Torquane, running well ahead of his men, ignited with a pitchy pine brand the fuse of tindery vegetable fiber which he had prepared for the earthen jar. The fuse burned perilously close to the jar's contents ere he came within hurling-distance of that savage horde. He heard another and harsher crashing, followed by wild shouts of triumph, as if the door had given way.

Then the jar, flung with all his strength, exploded with a great flash that lit the entire scene, together with a deafening detonation as of mountain thunder. Torquane, who had been prepared for some violent result, was hurled backward to the ground with stunning force; and his followers stood aghast, believing that they had witnessed the falling of a fiery bolt launched by some hidden Custodian.

A similar belief, it seemed, had been impressed even more powerfully upon the minds of the besiegers: for they fled on all sides in dire disorder. Some were speared in the darkness by Torquane's men, and the rest scattered amid the pines with frightful howls.

Thus, for the first time since the beginning of the dark era, gunpowder was used in battle.

Torquane, regaining his feet, found that the combat was already over. He advanced cautiously, and came upon the dismembered bodies of several of the invaders lying strewn about a garden plot that had been blasted and deeply pitted by the explosion. All the others, it seemed, had either escaped or been accounted for by his warriors.

There was small likelihood that the savages would soon repeat their assault on the laboratory.

However, for the remainder of that night he and his followers kept watch about the building. Lest its inmates should mistake them for enemies, he went more than once to the portals, which had been shattered inward by the pine ram, and shouted aloud to declare his peaceful intentions. He had hoped for some sign from the girl; but all the windows remained lightless, and a tomblike silence hung upon the building.

At earliest dawn, Torquane, accompanied by two of his warriors, ventured to enter the courtyard. In an angle of its opposite side, they came to an open doorway giving admission to a long empty hall illumined dimly by a single globe of mysterious blue light.

They followed the hall, and Torquane shouted as they went but was answered only by hollow-sounding echoes. A little awed, and wondering if the silence might betoken some cunning trap, they reached the hall's end and paused on the threshold of an immense chamber.

The place was crowded with unknown, intricate machines. Tall dynamos towered to the skylighted roof; and everywhere, on wooden benches and shelves or stone-topped tables, there were huge and strangely shaped vessels, and vials and beakers filled with hueless or colored liquids. Gleaming, silent motors bulked in the corners.

Machines of a hundred forms, whose use the young barbarians could not imagine, littered the paved floor and were piled along the walls.

IN the midst of all this paraphernalia, an old man sat before one of the vial-laden tables in a chair of cedarwood. The light of sunless morning, livid and ghastly, mingled with the glow of blue lamps on his sunken features. Beside him the girl stood, confronting the intruders with startled eyes. "We come as friends," cried Torquane, dropping his bow on the floor.

The old Custodian, glowering with half-senile anger, made an effort to rise from his chair, but sank back as if the exertion were beyond his strength. He spoke faintly, and motioned with weak fingers to the girl, who, lifting from the table a glass filled with a water-clear liquid, held it firmly to his lips. He drank a portion of the liquid, and then, after a single convulsive shudder, he rested limply in the chair, his head lolling on his bosom and his body seeming to sag and shrivel beneath its garments.

For an instant, with dilated eyes and pallid features, the girl turned again toward Torquane. It seemed that she hesitated. Then, draining the remainder of the hueless liquid from the glass in her hand, she fell to the floor like a toppling statue.

Torquane and his companions, amazed and mystified, went forward into the room. A little doubtful of the strange contrivances that surrounded them, they ventured to inspect the fallen girl and the seated ancient. It was plain that both were dead; and it dawned upon them that the water-clear liquid must have been a poison more swift and violent than any with which they were familiar: a poison that was part of the lost science of the Custodians.

Torquane, peering down at the still, inscrutable face of the girl Varia, was filled with a blind mingling of sorrow and bafflement. It was not thus that he had dreamed of entering the guarded citadel and winning the Custodian's daughter.

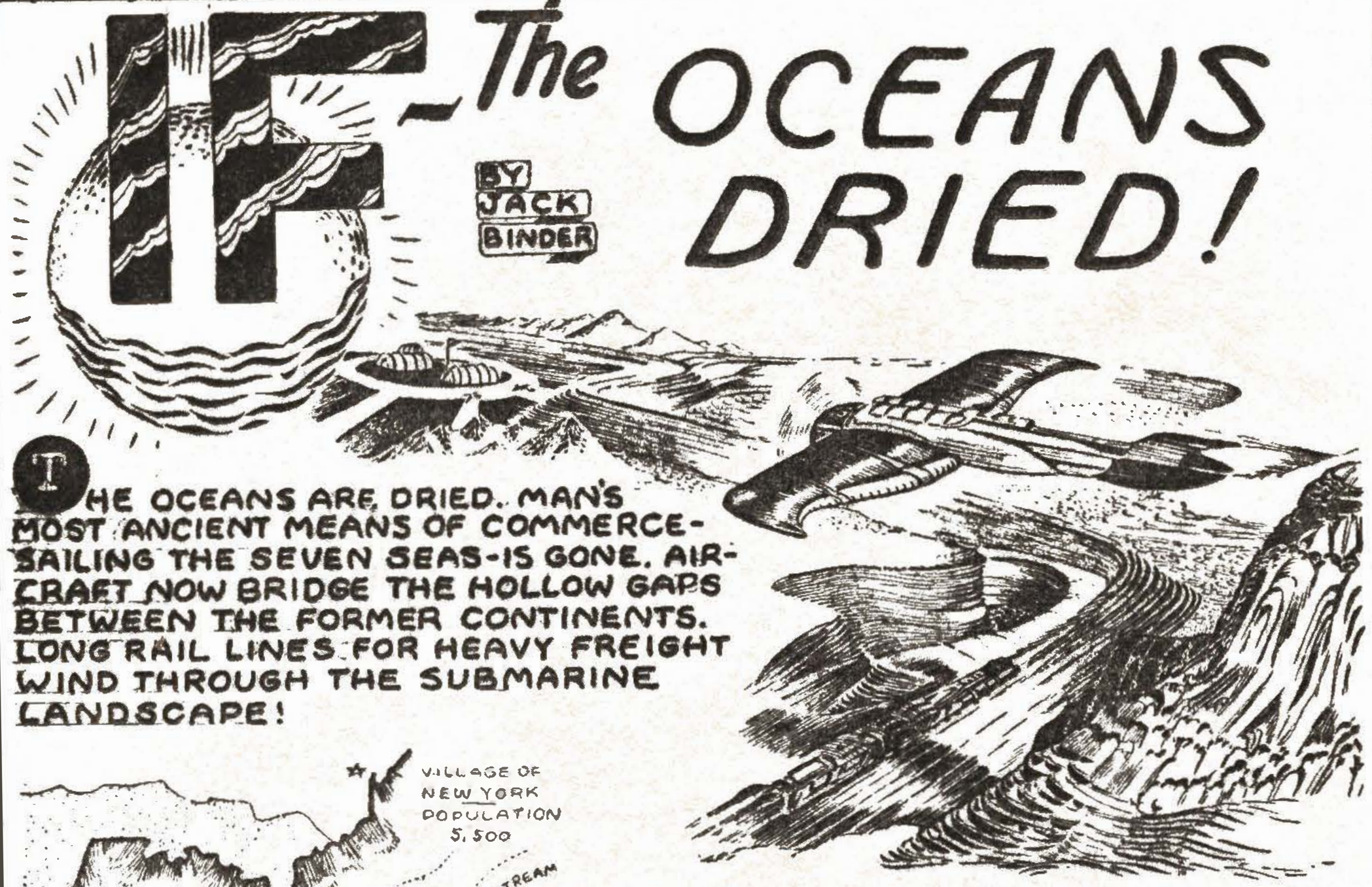
Never would he retrieve the mysterious lore of the Custodians, or understand their machines, or read their ciphered books. It was not for him to finish the Promethean labors of Atullos, and reilluminate the dark world with science. These things, with the girl Varia for mate and instructress, he might have done. But now, many centuries and cycles would pass, ere the lifting of the night of barbarism; and other hands than those of Torquane, or the sons of Torquane, would rekindle the lamp of ancient knowledge.

Still, though he knew it not in his sorrow and frustration, there remained other things: the clean, sweet lips of the simple hill-girl who would bear his children; the wild, free life of man, warring on equal terms with nature and maintaining her laws obediently; the Sun and stars unclouded by the vapors of man's making; the air untainted by his seething cities.

Next Issue: CONQUEST OF THE DEEP, a Special Article by WILLY LEY

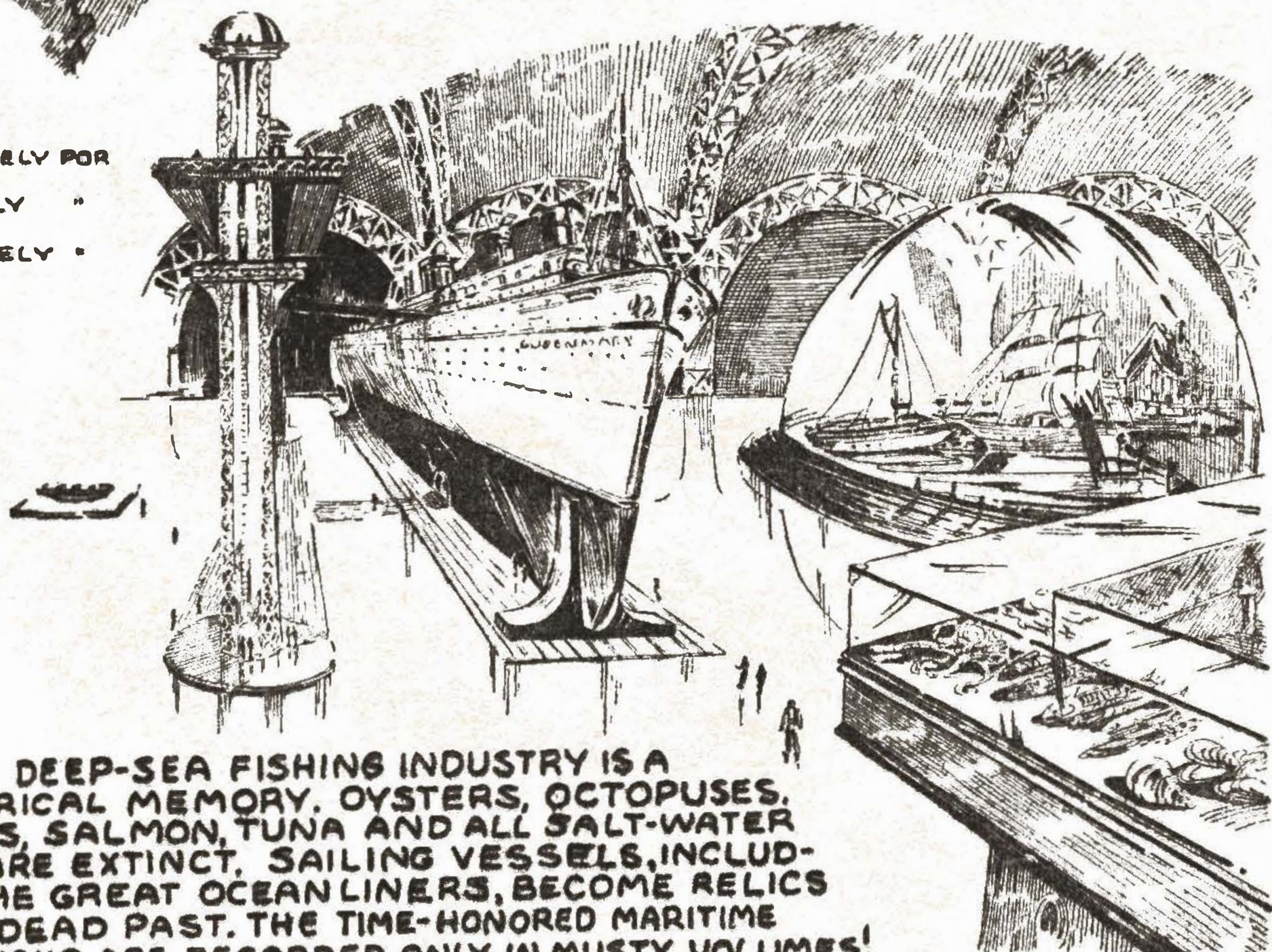
IF—The OCEANS DRIED!

BY JACK BINDER



THE OCEANS ARE DRIED. MAN'S MOST ANCIENT MEANS OF COMMERCE-SAILING THE SEVEN SEAS-IS GONE. AIR-CRAFT NOW BRIDGE THE HOLLOW GAPS BETWEEN THE FORMER CONTINENTS. LONG RAIL LINES FOR HEAVY FREIGHT WIND THROUGH THE SUBMARINE LANDSCAPE!

THE ONCE IMPORTANT AND STRATEGIC PANAMA CANAL IS FORGOTTEN AND USELESS. EARTH'S WEATHER, UNTEMPERED BY THE STABILIZING WATERS, UNDERGOES A PROFOUND CHANGE. AMERICA'S EASTERN COAST, NO LONGER WARMED BY THE GULF-STREAM, BECOMES ARCTIC IN WEATHER. THE POPULATION IS FORCED SOUTHWARD!



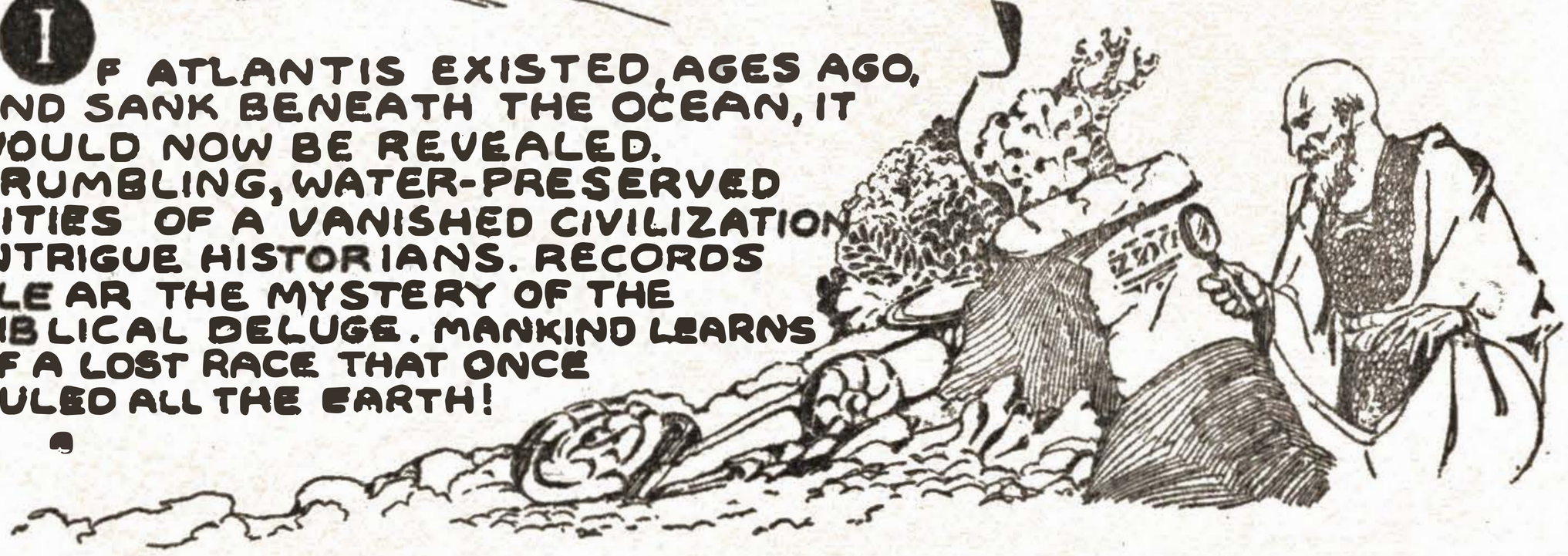
THE DEEP-SEA FISHING INDUSTRY IS A HISTORICAL MEMORY. OYSTERS, OCTOPUSES, CLAMS, SALMON, TUNA AND ALL SALT-WATER FISH ARE EXTINCT. SAILING VESSELS, INCLUDING THE GREAT OCEAN LINERS, BECOME RELICS OF A DEAD PAST. THE TIME-HONORED MARITIME TRADITIONS ARE RECORDED ONLY IN MUSTY VOLUMES!

Featured in Next Issue:

EARTH'S NATURAL RAINFALL DROPS TO A BARE MINIMUM. AN ELABORATE SYSTEM OF "CANALS" BRINGS WATER FROM THE POLES, LIKE THE ALLEGED ONES OF MARS. AGRICULTURE BECOMES AN ENGINEERING SCIENCE!

THRIVING COMMUNITIES SPRING UP IN THE RICH SALT BEDS OF THE OCEAN HOLLOWS. ALMOST EVERY KNOWN CHEMICAL BASE IS MINED AND QUARRIED. GOLD AND RADIUM SALTS, NOW CONCENTRATED, ARE EXTRACTED IN ENDLESS QUANTITIES. A GREAT NEW INDUSTRY FURNISHES CIVILIZATION WITH UNLIMITED RAW MATERIALS. MANKIND IS ENRICHED!

IF ATLANTIS EXISTED, AGES AGO, AND SANK BENEATH THE OCEAN, IT WOULD NOW BE REVEALED. CRUMBLING, WATER-PRESERVED CITIES OF A VANISHED CIVILIZATION INTRIGUE HISTORIANS. RECORDS CLEAR THE MYSTERY OF THE BIBLICAL DELUGE. MANKIND LEARNS OF A LOST RACE THAT ONCE RULED ALL THE EARTH!



Only One Man's Skill Could Save Humanity from Loss of Vision—But That Man Was Sightless!

A queer hybrid machine producing radio waves and power charges

RAYS OF BLINDNESS

By WILL GARTH

Author of "The Bloodless Peril," "The Night-Men of Mars," etc.

LONG, slender fingers—musician's fingers that gave proof of the sensitive, scholarly mind controlling them—caressed the sleek, smooth outline of an upright cathode tube. Somehow, there was an infinite sadness in the gesture. The train of associations engendered by the exploring fingers gave their owner a clear mental picture of the tube's intricate insides—its sturdy grid of tantalum, target plate of tungsten, and platinum filaments.

A mental picture, nothing more. For the man whose sensitive touch went so sadly over the tube was blind!

Every morning for ten years Thaddeus Harper had come into his labora-

tory and caressed its apparatuses with that melancholy, aching feeling that seemed to tear his soul out by the roots. Every morning his stroking fingers started memory patterns and he would picture himself moving and working among the instruments, tuning, adjusting, experimenting.

A certain apparatus always engaged most of Harper's attention, in this dream laboratory. It was large, complicated, a maze of coils, tubes and spinning parts. The fiery heart of it always glowed mysteriously, as if it held a great secret. Then, suddenly, there would be a shower of sparkles. A searing, blinding beam would spring forth from the machine, an awful radiation of unleashed fury. Always, in this dream, it had stabbed straight toward him, toward his eyes.

Thaddeus Harper shuddered and a low wail escaped from his tight lips. Ten years ago it had happened, yet the horror was fresh in his mind. His eyes had been burned out, forever. His career as a scientist was ended. His great researches in the atomic field had been blasted by that eye-searing explosion. For what good was a blind scientist?

Thaddeus Harper started as he heard the door latch click. His sensitive ears recognized the entering footfalls as those of his young son-in-law, Burt Chandler. Then he heard his cheery greeting.

"Good morning, Skipper! Always beat me here, don't you? And you always look fresh as a daisy!"

But young Burt Chandler's face did not echo his hearty greeting. It always depressed him to see this old, stoop-shouldered white-haired man fumbling sadly with his helpless hands. Chandler loved him for his kindly soul, and as the father of his wife, but pitied him more.

Thaddeus Harper turned his wrinkled, prematurely aged face in the direction from where Chandler's voice had come. His sightless watery eyes seemed to strain to picture the face he had never seen.

"Burt," he pleaded in his quavering old voice, "let me help you today. I won't be in your way."

Chandler's shoulders jerked from the pathos of it, yet it could not be. Old Harper *would* be in the way. He meant well, but his fumbling fingers would offer no real help. And his mind, though perhaps as keen as ever, had a habit of wandering off at all odd times, in day-dreams that made his efforts futile.

Trying to frame his lips in gentle remonstrance, Chandler paused and turned to the door. Alicia, his wife—Harper's daughter—had entered. They exchanged sympathetic glances.

"No, father," said the girl softly. "Burt is working on a very delicate experiment. That new book has arrived anyway, Father — *Atoms and Subatoms*. Shall we go in the garden? I can read it to you."

They treated him as if were a child —cajoling, chiding, bribing. One part of Harper's mind realized that and resented it. But the other part, that which had been strangely affected by the accident of ten years before, yielded to these simple methods of governing.

Harper, murmuring unintelligibly to himself, made his way toward the door, using the light stick in his hand to warn him of walls and bench corners.

Alicia's face reflected the ache in her heart for the weary, stooped figure shuffling toward the door. Then she turned to her husband. Her eyes were moist. Strangely, so were Chandler's. But both knew it wasn't what it seemed. They had steeled themselves, in sheer necessity, to keep their pity for the old scientist locked deep.

"I see it has affected you too!" exclaimed Alicia, looking into her husband's eyes. "Burt, what can it be? Is it really a terrible epidemic? Your eyelids are tinged with red, the whites of your eyes are bloodshot, and the pupils contracted. Those are the same symptoms dad had before his eyesight—"

"Nonsense, dear!" scoffed Chandler. "In my case, it's overwork—common eyestrain, from working too late at night. I've been putting all I've got into this research and, by glory"—his voice became enthused—"I'm getting results! My atomic vortex—"

His tone had become preoccupied

and his tall, athletic body moved gracefully toward the tube beside which the old scientist had stood. Atomic energy was his goal, in common with the newest army of young scientists all over the world. He wished to rouse the Titan who lurked in the locked citadel of the atom, and make it do the world's bidding.

"But, Burt," remonstrated Alicia, "the epidemic is spreading. It's showing in the baby's eyes too."

"Eh?" Chandler turned his head momentarily. "Then you'd better call the doctor." He bent over the tube, eyes intent.

OLD Thaddeus Harper, comfortably seated in a lawn chair in the garden of their home, felt contented in the warm, pleasant sunshine that laved his skin. Alicia's soft, well modulated voice read to him from *Atoms and Subatoms*, the latest work in atomic physics.

"Alicia!" exclaimed the old scientist suddenly interrupting her in the middle of a sentence. "What were you talking to Burt about just before we left the laboratory? Some epidemic affecting the—eyes?"

The girl started. Her father had put a peculiar emphasis on the last word. Naturally, he would. She leaned over and patted his hand soothingly.

"It's nothing, dear. Nothing for you to worry about." She leaned back and resumed her reading.

Sometime later a deep voice was heard from the garden gate, calling a general greeting. Harper recognized it immediately as the voice of their family physician, big, bluff Dr. Howard. He heard the heavy footsteps crunch in the gravel path up to them. He sensed the doctor's eyes on him.

"It's the baby," said Alicia, maternal concern in her voice. "It's eyes are red and inflamed. Dr. Howard, I'm alarmed. This epidemic—"

A vague uneasiness stirred in Harper. He listened intently as the physician spoke.

"Alicia," he said in fatherly tones, "all medical science is stumped. I've had a hundred calls for the same thing this morning. I can't possibly answer them all. And there really isn't a thing I can do for your baby. No medicine or treatment seems to have any effect. About all you can do is put the baby in a dark room and wash its eyes out with boric acid solution every hour. In fact, you should do the same for yourself—"

"Dr. Howard!" Alicia's voice was sharp. "Your own eyes are red, inflamed!"

The physician gave a short, harsh laugh, as though he had been unmasked in some negligence. If Harper could have seen, he would have noticed a haggard hopelessness in the man's face.

"That gives you some idea of the extent of the disease, and its virulence," said Dr. Howard. "Even we doctors can't do a thing for ourselves! Haven't you read the morning's paper? Or heard the news on the radio? The epidemic, if such it really is, has spread—"

His voice broke off abruptly, and old Harper knew, with the wiseness of the blind, that Alicia had stopped him. The girl took her warning finger from her lips.

"I'll do as you say, Doctor. But come and see the baby—"

The old scientist, left alone, struggled up from his chair. His brain felt stirred as it had not been for ten long years. They were trying to keep something from him, something vital and important! It was as though he were a child whose sensitive mind must not be shocked. Harper did not often concern himself with the events of the times; he lived mostly in a dark world of past images. Ordinarily he would have dozed off in the sun, dreamy and stoically content with his lot. But now —today—

Knowing the way so well that he had little use for his stick he made his way down the garden path of the large back plot, and entered the house by the rear door. He made his way to the living room door and stood rigid listening intently. Alicia was still outside, talking to the doctor. The maid was upstairs, cleaning. Harper went up to the radio, groped for its dials. It occurred to him now that Alicia had contrived to keep all news reports off the radio in the past few days.

He tuned the dials swiftly. Snatches of music and simpering announcements succeeded finally by the earnest voice of a news commentator. Harper stiffened at what he listened:

"Latest news flash! The mysterious eye-disease has reached the proportions of a universal epidemic! Since its reports in isolated cases two weeks ago among aged people and very young babies, it has spread with the rapidity of a Middle Age plague. Today, it seems that almost no one has been left untouched. Reports from India, Australia, Africa, Europe, South America — all the world! — indicate that the plague has struck everywhere at once.

"And most incredible of all, every animal has it too. Dogs, cats, cows, horses—all of them. What incredible, awful scourge is this that has gripped the Earth?

"The scientific world is aghast. Biologists and medical men of every degree admit their inability to diagnose the malady. It is completely and utterly unknown to science. But they are working indefatigably to solve the riddle. One thing they have found is that the irritation is less at night. Darkness seems to bring temporary relief—"

The speaker went on after a brief pause, with an ominous timber in his voice.

"Heretofore, the epidemic has been nothing more than an annoyance, symptomized by a redness and soreness of the eye and eyeball which is not worse than the common disease 'red-eye'. But scattered reports have come in last night and this morning that the earliest cases of the new disease have resulted in *total blindness!*

"Whether this blindness will be temporary or not is not known, but already the weakened eyes of hundreds of aged people and little babies have become dark and unseeing!"

Harper snapped off the radio. His ever active mind became furiously active, told him what the announcer had not dared say—the possibility that the strange disease would continue its cycle and strike all the world with blindness! Would there come a cheerless day when all humanity would be blind?

Thaddeus Harper's brain reeled. God forbid! He knew the helplessness, the crushing despair of blindness. Those weary, futile years of lightless, lifeless darkness. Man needed his eyes more than of any other of his senses; was only half a man without his eyesight. Thaddeus Harper knew that too well.

The threat of universal blindness lay over the world! And this was the stupendous thing they had tried to keep from him!

Something clicked in Thaddeus Harper's mind. Some inexplicable sequence of thoughts came to a startling conclusion. Like an amnesia victim awakened through a chance phrase or picture, he became suddenly aware under the driving impetus of this amazing, shocking thought. The Thaddeus Harper who left the radio was not the same old, broken scientist who had come to it. His physical blindness remained, but the blindness of the mind had vanished.

He stumbled in his eagerness to reach the door. Out in the garden, he stepped out under the sun and spread his arms to each side of him. They were bare to the elbow and the hot rays of the sun burned on his skin. He turned his face to the sunlight. Though no slightest ray of light pierced the midnight gloom of his sightless eyes, he could feel the powerful rays beating on them. He stood this way for a minute.

Then, he turned and made his way to the laboratory, which was housed in a separate brick building to the back, next to the garage. He opened the laboratory door without knocking and stepped in. He breathed deeply of the old familiar smells. It was like a heady wine, making him dizzy.

Alicia was with her young scientist husband and Harper, hearing her stifled sob, realized that she had been talking to him about the epidemic and the danger to their child.

Harper made his way between the familiar benches to where they stood. He could feel the heat of the cathode tube with which Chandler had been working.

"Why, father, what are you doing

here?" cried Alicia.

"I just heard the radio—the news," he said in a new assured voice so different from his former aimless mutterings. His shoulders were straighter. His chin was up and his face alive.

"You mustn't agitate yourself, dear. Come—" began Alicia.

"Listen to me, both of you!" Harper's voice rang through the laboratory, in the tones he had had years before. "You must do one thing immediately—get goggles with lead-glass lenses and wear them constantly in the daytime. You must do this right away, for the sake of your eyesight!"

"Father, you're not serious!" Alicia said.

"Just a minute," cut in Chandler, as he stared into the old scientist's face, his eyes suddenly thoughtful. "What do you mean, sir? Why should lead-glass goggles—"

"The sun! That's the answer!" shouted Harper. "It's not a disease that is sweeping the world and bringing blindness. It is the sun! Did you hear them on the radio—relief at night? That was the first clue. Animals have it, that was the second. Third, it struck all over Earth at once.

"Then, I stood out in the sunlight, felt it beat on my skin. A blind man's skin, a sense of feeling—my eyes. I could feel the new rays in the sunshine. The new and more powerful sunlight that is impregnated with a certain deadly radiation inimical to the delicate retina of the eye. It is sunlight, I tell you, not disease!"

The old scientist stopped, gasping for breath.

"By heaven, I think you're right!" exploded Chandler. "Oh, what a fool I've been not to see it myself. What fools all scientists have been—"

He turned to Alicia. "Hop in the car and go to the optician's. Buy a dozen lead-glass spectacles—the goggle kind with large, curving lenses. Hurry!"

When she had left, the young scientist said, "Sir, let's get to work. I didn't realize myself how serious the situation is till Alicia came in and told me what Dr. Howard had said, and showed me the morning's paper reporting thousands of cases of blindness. We must determine the exact type of harmful radiation, then inform the authorities so they can take steps to save the world's eyesight. I think a spectroscopic survey of sunlight—"

"We won't have to search for the harmful radiation," interposed Harper quietly. *"I know what it is!* It is the seventh octave of the electromagnetic scale above visible light. About the point where ultra-violet merges into the X-rays. The sun has suddenly begun to produce large amounts of this radiation, and it is beating against the human eye, the eyes of all living creatures, and they have no protection."

"The seventh octave! But how did you know?"

Harper reached up a hand and touched his useless eyes. "By these," he said sadly. "It is the same radiation that blinded me! I've never spoken to you about it, Burt, but I was working on atomic structure. I struck some vital clues. Perhaps I went further in my work than any present-day scientist.

"I worked with high temperatures and pressures, comparable to those of the sun. In fact, I had an almost microscopic bit of pseudo-sunlight in my apparatus. It gave off powerful energy—energy of the atom. I began to map out the complete evolution of atomic energy from matter, in successive waves. Eventually, my calculations were able to predict the final stages.

"I should have been warned," he sighed. "My figures showed the great burst of energy coming. Perhaps my apparatus was defective. I thought it would hold. There was an explosion and the radiation of the seventh octave produced sprang over to me, into my eyes—"

Harper made a gesture of resignation that made a lump come up in the younger man's throat. Then he went on:

"The shock of the accident did something to my mind, besides ruining my eyes. It put me in a mental fog. I destroyed all my notes, in a sort of insane determination that no one else should suffer the same fate, by the same experiment. There must be other, safer ways to release atomic en-

ergy, I told myself, other than by duplicating the fiery furnace of the Sun.

"The mental fog has lasted for ten years. But today it is lifted. Today I realized that the Sun had done exactly what my laboratory bit of Sun had done—passed through the next phase of its evolution, releasing a burst of new energy.

"There is an evolution of Suns, just as there is an evolution of life. A star is born from nebular condensation. The tremendous pressures light the atomic spark. A terrific conflagration starts which lasts for billions of years, till the star burns itself out. But in that time it passes through stages of increasing energy to a peak, and then decreasing stages to the final entropy of heat-death.

"Our Sun is in the increasing stages. It has had several jumps in its energy output. More than a million years ago it had the last one. Today—now—it has had its next, producing this radiation of the seventh octave, which is inundating Earth and burning out eyes never meant to withstand it—as my eyes were burned out."

"The seventh octave rays must have some of the penetrative power of X-rays, going through solid material," mused Chandler. "That accounts for the universal effect on the eyes. It gets to people whether inside buildings or out in the Sun."

Harper nodded. "But at the same time it is more in the order of a powerful ultra-violet radiation. Glass, especially lead-glass, in the usual thicknesses, will stop most of it."

"Sir, do you realize what it means?" exclaimed Chandler suddenly. "It means the human race will have to wear protective glasses for the future ages, from birth to death! Perhaps in time—hundreds of thousands of years from now—evolution will produce human offspring with eyes adjusted to the new radiation. But for the present, it means glasses for all humanity!"

"Better that than blindness," said the old scientist. His hands fumbled again to his sightless eyes, and Chandler caught in the gesture the ten years of utter futility in which the other had lived, lost in a dark, lightless world.

"Call the offices of the *Journal* of *Astrophysics*," Harper went on. "Give them a short resume of the Solar phenomenon that has just occurred. Have them contact the authorities."

Chandler dashed to the phone, dialed swiftly.

A WORLD well-frightened by the menace that threatened to strike it with universal blindness heard the news the next day.

First, the editor of the *Journal of Astrophysics* received a phone call that he thought must be part of a hoax. But when, several hours later, he received a check-up message from Mt. Wilson Observatory, he acted like a madman. He called Chandler on the phone and offered him fifty thousand dollars to write an article on the subject. His jaw sagged when Chandler offered to write it for nothing.

Mt. Wilson, at the editor's suggestion, had immediately measured the diameter of the Sun, its Solar constant of average radiation, and the intensity of the seventh octave rays. The results created pandemonium.

The Secretary of State at Washington was contacted by Mt. Wilson authorities. An hour later a hasty conference of high officials, including the President, was called. Plans were made by these men—all red-eyed in common with the rest of the world—to equip all people with goggles.

Wealthy manufacturers were stunned on receiving very official looking documents from Washington which commanded them to manufacture as many goggles as they could, with expensive lead-glass, and to distribute them *free!* Department of Justice men delivered the orders and were firmly insistent when the manufacturers remonstrated.

The news broke for the newspapers and radio at noon. By two o'clock every conceivable type of protection for the eyes had been sold out. Factories began turning out specially designed lead-glass goggles by the carload.

Cables hummed and European people began to appear in a few days with

similar goggles. The hinterlands of the world were not so fortunate, having small facilities for manufacturing goggles. They would have to wait till the industrial nations had supplied their own peoples.

The world met its greatest emergency with its greatest effort, and for once in its turbulent history, all worked together, toward one goal. The tremendous industrial powers of civilization concentrated on one product and broke all records for speed. Such trivial things as cost of production, transportation expense, and retail value were forgotten.

In less than a week all the civilized world had been equipped with glasses. It took another week for the more outlying sections of the world to be equipped, even though every nation's air force had been volunteered for the project. Certain tribes in inaccessible parts of Africa were doomed to blindness, but brave missionaries planned trips to them, to save the sight of the unborn generations.

The world breathed a sigh of relief. Blindness, perhaps the most dreaded of afflictions, had been averted. A world of two billion blind would have been a shambles. As it was, all animal life was doomed to blindness, but that could not be helped.

THE world's acclaim fell about Harper's shoulders. He waited patiently till the furor had died away and he was left in peace again. Fame and honor meant little to him. His greatest satisfaction lay in the thought that he had once again regained his full mind. For ten years he had moved in a state of mental bewilderment. His keen mind had been cloaked in a shroud from the shell-shock of the accident that had blinded him and ended his career.

But now he was once again the scientist, helping his son-in-law in the laboratory, discussing with him every phase of his researches, advising, assisting.

Chandler's researches took on new life with Harper's assistance. He had been on the right track but advancing slowly. Atomic power lay within his grasp, though he did not know it. His approach was far different from that which Harper had used a decade before. Instead of breaking down matter, as in the processes of a younger star, he was building up matter, as in the older stars waning toward the state of entropy.

Chandler was discussing his progress with his father-in-law.

"In the formation of tritum—the isotope of hydrogen with atomic weight three—from hydrogen, there is a great release of energy, as the formation of helium from hydrogen," he said. "This follows the general rule that there is emission of energy in both the breaking down and building up of atoms. But, of course, my main problem is to increase the output of energy. So far my collisions of deuterons and protons are one in a million."

Chandler stared moodily through thick goggles of lead-glass at his projector of subatomic particles. "Still, when I started the rate was one in a billion. I've increased the efficiency a thousand times. But not till I get a percentage of one in a hundred at least will I have true atomic power."

"And that's what we'll do," said Harper with quiet conviction. "Just give me the daily results of bombardments under slightly altered conditions. There is some theoretical mean which will determine exactly how to achieve the maximum results. Once we have this formula, it will be easy."

Harper used a soft, greasy pencil for his calculations, so that he could run his sensitive finger-tips over the raised figures when he needed to recapitulate. Chandler's daily results went in as numbers and came out as condensed mathematical formulae.

A few months later the old scientist handed Chandler a tentative result. Chandler cried out like a wild Indian when he set his apparatus according to the formulae.

"You've done it, Father! Atomic energy and lots of it! And it comes out as nicely and quietly as you could want, like electricity from a battery."

Harper touched his eyes, thinking again of that other form of atomic en-

ergy, which had burst out like a supernal flame, and destroyed the eyes of its creator. This atomic energy came out like the current in a wire. His had come out like a lightning-bolt.

"I'm glad, Burt," he said simply.

All that day Harper was preoccupied. In the evening he faced the enthused young scientist with a serious mien.

"Burt," he began, "aside from the commercial possibilities of your process of atomic power, it has one other great possibility. With it we can perhaps eliminate the menace of blindness from the Sun entirely, so that the human race will not be doomed to wear protective glasses through the ages."

"But how would you do it?"

Harper's answer was indirect. "You know, of course, that the only thing that keeps most of the Sun's powerful ultra-violet radiation from toasting us to a crisp is the layer of ozonized air extending from about fifteen miles to twenty-five miles up. But if all the ozone itself were condensed, it would amount to no more than a sheet of tissue-paper thinness. Yet that is enough to filter out most of the ultra-violet. Now suppose there were a similar layer up there which absorbed most of the new radiation—the seventh octave rays inimical to human eyesight?"

"I see," nodded Chandler. "What substance will do it?"

"Tritium!" returned Harper, working his hands together eagerly. "The same material you form in your atomic energy process. It, like ozone, is composed of a triad of atoms. Ozone is the triad of oxygen. Tritium is the triad of hydrogen. And the latter will filter out the rays of the seventh octave, as ozone filters out those of the second and third, the ultra-violet."

"But think of the task!" Chandler was a bit dazed. "Even a tissue-paper thinness of it spread all over Earth's tremendous surface would amount to millions of tons of it!"

"The beauty of atomic power," continued the old scientist, "is that it is cheap and endless. There is a layer of hydrogen overlying the general atmosphere. It extends from the high stratosphere of fifty miles to the fringes of Earth's atmosphere, two hundred miles out. That is our raw material. We will convert some of this vast ocean of hydrogen to tritium. Our main problem will be to get rid of energy. But that, I think, will be simple enough. The atomic energy formed will radiate into space and into the lower atmosphere. The latter process will only heat it up some few degrees, temporarily."

Chandler was pacing the room in excitement. Then his face fell.

"But how can it be done? We would have to install a projector of high-speed protons up there in the hydrogen layer, to start off the process. No man-made object has ever been sent that high, a hundred miles or so!"

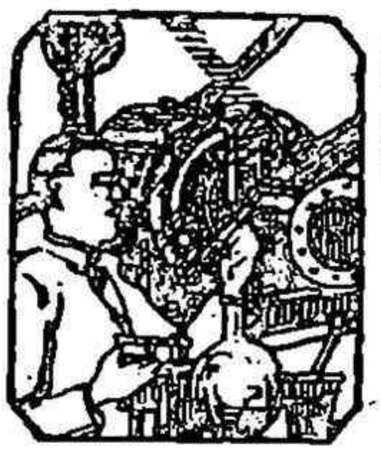
"Of course not," agreed Harper. "Our projector will stay right on Earth's surface. But its effects will be sent up to the height we want. Radio waves. You know that short radio waves are reflected by the Kennelly-Heaviside layer, which is about fifty miles up.

"Long waves go higher and are reflected by the Appleton layer, anywhere from one hundred to two hundred and fifty miles up. If we phase our static charges that produce high-speed protons into low-frequency radio waves, we can project them to the Appleton layer. Here, in the heart of the hydrogen belt, the formation of tritium will be started. The process will stop by itself when the concentration of tritium atoms has reached a certain point, which will easily be enough to form a thoroughly protective tritium-layer to absorb seventh octave rays."

Harper touched his eyes, involuntarily. "It is merely the extension of our laboratory method to the great laboratory of nature!" he concluded.

A YEAR later all their calculations and preparations had been made. Chandler had hired the necessary assistants to build the apparatus—a queer hybrid machine producing radio waves and power-charges capable of blasting out protons moving at half the

(Continued on Page 128)



Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited, we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also, to promise an immediate answer in every case. However, questions of general interest will receive careful attention.

EARTHQUAKES

Editor, Science Questions and Answers:

I've always marveled over the fact that scientists watching a machine thousands of miles away from an earthquake can tell where the earthquake occurred and how intense it is. I understand this is determined by means of the seismograph. Can you tell me on what principle this instrument works?

B. E.,
Erie, Pa.

The principle of the seismograph is based on the familiar **inertia.** Inertia shows itself as a resistance to motion. If a body is at rest, it wants to stay at rest. If a body is in motion, it wants to stay in motion. Thus because of its inertia the seismograph stays still while the ground underneath it moves.

A seismograph is a pendulum with its tip resting on a sheet of paper covered with lampblack. This paper is wound on a drum which is kept revolving by clockwork under the pendulum. With the ground at rest the tip of the pendulum scratches out a white line in the lampblack on the paper as the drum moves continually forward under the pendulum.

If the earth quivered, that is, if an earthquake occurred, the drum, since it is attached to the earth, would also quiver and this quiver would be traced out in the lampblack as a sideways motion due to the sideways motion of the drum under the tip of the pendulum. The pendulum is so suspended that it can move only from side to side in one plane. If two such pendulums be placed, one facing north and south and the other east and west, they will between them pick any quiver from whatever direction it comes.

The motion of such a simple pendulum will, of course, be very slight—particularly if it is some distance from the scene of the quake. To magnify the motion so as to make it more visible, several devices have been introduced.

The better instruments use sensitized photographic paper. The pen is a tiny beam of light reflected from a mirror attached to the end of the pendulum—a motion of the mirror causing a motion of the beam of light over the photographic paper.

The most sensitive types of seismographs have a coil attached to the end of the pendulum. Two powerful magnets are set up on either side of the coil and each quiver of the coil in this magnetic field generates a current which moves the mirror of a galvanometer, the mirror in turn reflecting a light spot back and forth across the photographic paper to give us our record of the earth's motion magnified about 2,000 times.

When an earthquake occurs the whole earth quivers and this quivering can be detected by seismographs, utilizing the principle of inertia. But how can we tell from a record of this quivering just where the earth did quake?

When the earth quakes, it sends throughout the earth two distinct kinds of quiver—two distinct kinds of ripples which travel at different rates. One pushes or compresses the earth ahead of it and hence is called a compressional wave, and the other shakes the earth from side to side as it travels and hence is called a transverse wave.

These two earthquake waves travel at different rates—about five and three miles per second, respectively. For every second we can count between the compressional and transverse waves, the quake is a corresponding distance away. For example, in the last Utah quake, the number of seconds counted at Fordham University between the two quake waves was 293, amounting to a distance of 1,940 miles. The seismograph records the arrival of these waves, and the exact second at which each arrives is told by time marks placed automatically on the record by an accurate clock.

Now if we have three stations in communication, the matter of determining the direction is simple. If we describe three circles on a globe with each of the three stations as centers and the distances of the quakes from their respective stations as radii, the three circles can intersect only at one point, and that point is the center of the earthquake. —Ed.

NEON SIGNS

Editor, Science Questions and Answers:

In view of the fact that neon emits a RED light, how do you account for the fact that all gas tube lighting (yellow, green, blue, etc.) is called "neon lighting"? Isn't this inaccurate?

W. M.,
Chicago, Ill.

The term "neon lighting" is somewhat inaccurate as commonly used. Five gases are used in tube lighting. They are argon, krypton, neon, xenon, and helium. These gases are all closely related in their atomic structure, and are all comparatively inert, that is, they do not combine readily with other chemical elements. They are all found in the atmosphere in very minute quantities. Xenon is the heaviest and rarest of these gases. It is found in the atmosphere in one part in twenty million. It is mainly used as a voltage lowering agent for the other gases which produce the colors.

Argon is mixed with krypton in the tubes to give a blue color with mercury vapor acting as a catalyzing agent. Argon, in an amber tube gives off green light.

Neon emits a red light, the most familiar color. Helium, the lightest of this group of gases, gives off a white light, or a golden one if it is contained in a yellow tube.

These gases are obtained from the air by fractional distillation. A part of the atmosphere is cooled by means of a bath of liquid air. Then, by careful temperature control, the liquefied rare gases are distilled or boiled off in turn and collected in gas receivers known as bombs. Each gas has a different temperature at which it becomes liquid.

We are often asked what happens in a neon tube when the current is applied. When an electric current passes through the electrodes in each end of the tube, electrons are thrown off from the gases.

Let us picture a negative electron leaving an electrode and flying through the tube at a speed equivalent to the speed of light, coming in contact with another negative electron attached to an atom. When these two negative particles meet, they repel each other.

We may assume that this intruding electron's speed is so great as to succeed in ejecting the electron from its orbit. Then the atom suffering this condition will become **positive** in its nature. But this lost electron immediately returns to the atom from which it comes, and the atom is thereby restored to its natural electrical condition. When this happens the atom of neon emits light. A tube will go from full brilliancy to total darkness as many as 100,000 times a second. The illusion produced is that of a steady uniform glow.

A neon tube regardless of its length carries only a minute amount of gas in the tube. This amount of gas is being rapidly modulated at prodigious speeds.

The electrodes that are wholly surrounded by the gas in the tube are made of an alloy of secret composition that will not decompose or throw off particles when the tube is placed in operation. The electrodes are further treated by dipping into a special chemical solution that reduces sputtering to a minimum.

When the letters or design of a tube sign have been formed, the short glass tubes holding the electrode assemblies are sealed to the longer tubes of the sign proper. After the tubes are evacuated by means of pumps the desired gas is introduced. They are then connected to a source of current, whereupon, if there are no air leaks, they will glow.—Ed.

EVOLUTION OF MAN

Editor, Science Questions and Answers:

I've read many times that the notion that man is descended from the apes is false. How do you reconcile that with Darwin's theory to that effect?

S. J.,
New York, N. Y.

The widespread notion that man is descended from present-day species of monkeys and apes seems to be the central, if not the only, concept of evolution in the mind of the layman.

It is generally believed that Darwin in his **Descent of Man** claimed that the monkeys and apes, as we know them, evolved earlier than man and that man is a modified offshoot from these apes and monkeys. As a matter of fact, Darwin never held such a view. He realized that the apes and monkeys of today are specialized end products each of its own branch of the ancestral tree, and that not only is man not a descendant of any primate species, but no present monkey or ape is the descendant of any other.

The view held at the present time, as a result of all the evidence available, is that all the present primates have been derived, some earlier and some later, from a generalized ancestral primate stock, which has had one or a few main trends or branches and many minor or less successful trends or branches. The most successful, really the central, evolutionary branch of the primates has from immense antiquity been the man branch.

If there is a genetic relationship between man and the present apes, it would be more nearly in accord with the evidence to say that these various ape stocks have been derived, by processes of specialization of simian and therefore non-human characters, from the central man branch of primate evolution. This at least is more nearly true than is the popular impression; but by this the student of human evolution does not mean to say that apes or monkeys are degenerate men, though this would be better than saying that men are improved apes.

The common ancestors of apes and man are conceived of as possessing the characters that apes and man have in common and as lacking the human and simian specializations that now characterize the present end products of these divergent lines of evolution.—Ed.

THE SEA'S WEALTH

Editor, Science Questions and Answers:

Many scientists have remarked at one time or another that the oceans contain many valuable chemical elements and minerals, such as gold, silver, copper, iron, etc. Have you any more precise data of what one may expect to

find, say in one square mile of the Atlantic Ocean?

B. S.,
Englewood, N. J.

One square mile of the Atlantic Ocean seventy-six feet deep carried a treasure of $73,094,600 as it was pumped through the bromine plant of the Ethyl-Dow Chemical Company at Kure Beach, near Wilmington, N. C., during one year.

Only a part of this wealth was recovered in the form of several thousand tons of ethylene dibromide, which is an ingredient of Ethyl fluid, used in gasoline. The potential by-products, comprising 2,491,344.05 tons of minerals and chemicals included 86 pounds of gold valued at $36,300 and equivalent to a ball six inches in diameter. The silver content of the sea water amounted to 1.35 tons, which would make a ball about two feet in diameter, with a value of $25,120.

The seawater also contained 1,831,000 tons of sodium chloride, or common salt, worth $24,500,000 at present market prices. The salt, if compressed into one-foot cubes placed side by side would form a single row from New York to Los Angeles and half way back.

Other minerals occurred as follows:

Magnesium sulfate, or Epsom salts, 464,800 tons, worth $17,660,000, which if distributed among the 130,000,000 people of the United States would give each person more than seven pounds. Calcium chloride, 101,000 tons worth $2,220,000 which would help maintain about 20,000 miles of sand, clay, and gravel roads, or would help cure 7,000 miles of concrete pavement.

Potassium chloride, 52,250 tons worth $4,180,000 which would make about 1,000,000 tons of potash rich fertilizer. Magnesium, 41,900 tons worth $20,950,000, enough to make 200,000 stratosphere gondolas similar to those used in recent flights. Aluminum, 119 tons, worth $45,100, sufficient to furnish pistons for about 50,000 average automobiles.

Copper, 7.9 tons, worth $1,500, enough to make 300 miles of No. 15 telephone wire. Iodine, 2.76 tons, worth $8,280, which would make about 24,000 gallons of tincture of iodine for first aid purposes. Iron, 125 tons, valued at $7,500. Strontium carbonate, 138 tons, worth $82,800.

Besides these main constituents, practically every element and compound is dissolved in the ocean water. In extracting bromine from seawater, chemical science has accomplished the initial conquest of nature's greatest reservoir of minerals. Economic recovery of by-products is still a problem.—Ed.

"ATOM SMASHERS"

Editor, Science Questions and Answers:

Recently a popular weekly pictorial magazine presented some pictures of "atom smashers" in operation. As the text accompanying the feature was quite meager, I wonder if you would say something about the practical use of "atom smashers" in your highly informative and interesting department?

W. W. M.,
Wichita, Kansas.

A few years ago when physicists excitedly bombarded various sorts of matter with atomic particles and achieved various sorts of transmutations on a very small scale, the practical chemists working in industry or medicine did not see that it would help them very much.

Now some of the products of these transmutations are becoming valuable tools in the solution of problems that have nothing to do with what happens within the atom.

The artificially produced radioactive elements, created first in 1934, are being used as tags upon various chemical elements. Through their use, investigators can discover facts about the way things happen in industrial processes or in the way the body uses food.

These natural radioclements, such as the relatives of uranium and radium, have been used fruitfully as indicators in chemical and biological research. The artificial and short-lived radioactive substances promise to be even more useful. The circulation of phosphorus in the body has been investigated through the use of artificially radioactive phosphorus made by bombarding sulfur. New light has been thrown on the physiology of the brain by this study. The brain tissue is proved to be constantly regenerated, contrary to general assumption. Radioactive phosphatides were found in the brain after the animal had eaten the radioactive sodium phosphate.

Chemists can trace just how the atoms travel in important chemical reactions. And metallurgists can trace the speed, for instance, of the interchange of metal from one part of a molten mass to another.

These new tools of the scientific detective are not expensive or unduly intricate. A measurer of artificial radioactivity can be made from material in almost any radio shop and artificial radioelements can be manufactured for many purposes using simpler apparatus than the expensive atom smashers. —Ed.

GUIDE TO SCIENCE KNOWLEDGE ANSWERS

(See Page 29)

1—Page 20 in HOLLYWOOD ON THE MOON.
2—Page 73 in ROAMER OF THE STARS.
3—Page 33 in ECLIPSES OF THE SUN.
4—Page 34 in ECLIPSES OF THE SUN.
5—Page 113 in RAYS OF BLINDNESS.
6—Page 113 in RAYS OF BLINDNESS.
7—Page 113 in RAYS OF BLINDNESS.

The SCIENCE FICTION LEAGUE

A department conducted for members of the international SCIENCE FICTION LEAGUE in the interest of science fiction and its promotion. We urge members to contribute any items of interest that they believe will be of value to the organization.

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HISTORY-MAKING drama goes forward with incredible speed. 1938 sees the dawning of a new era of scientific appreciation. People are beginning to understand that the true scientist is not just a theorist, far removed in thought and achievement from the lives of people, but is a pioneer who gives increased powers to man.

Scientists are actively aiding movements for the constructive use of those increased powers by man. The true scientist in his search for truth is essentially an idealist, and has a high moral attitude; but his idealism in providing man with power may not be shared by those who use his power. In Alfred Noyes' description of Galileo demonstrating the marvels of his telescope in Venice, the only value which was apparent to the Ventian fathers was, "This glass will give us new powers in time of war!"

Science has pushed back the hunger line for countless millions, and has revealed the possibilities of an abundance of material things, from bread to automobiles, for every human being on Earth. It has solved the problems of production and transportation, and the mechanics of distribution. It has conquered most of the dreaded scourges, except cancer, and stands ready before many years to offer three-score-and-ten as the average span of life.

SCIENCE AND THE FUTURE

But science has one more Herculean task, according to Arthur H. Compton, the noted physicist. Science must meet the last great problem, the civilizing of human relations. It pleads at the bar of the world for a chance to cooperate with the spiritual in bringing peace on Earth. Science must do more than reveal the horror and futility of war. That is negative. It must do more than insist on the qualities of justice, fair play and peace. That is too general. It must definitely have a plan of action.

Human need supplies the motive for scientific action. Scientists are eager to help, through various methods of education. Therefore science looks to the future with anticipation.

SCIENTIFIC CONTEST

If you have an unusual scientific hobby, there is still time to enter our SCIENTIFIC CONTEST. Do you have a home chemical lab? Do you make space ship models? Do you collect meteorites? Do you prepare microscope slides? Do you collect fossils? Are you an amateur astronomer?

Whatever your hobby is, we are certain that you'd like to tell your fellow readers about it. Here's your chance!

The editors of THRILLING WONDER STORIES will award original

cover illustrations by Artist Brown to the writers of the most interesting letters on the subject, MY SCIENTIFIC HOBBY. Prize-winning letters will be published in an early issue of this magazine. Letters may be typewritten or written neatly by hand. They should not be less than 1000 words, nor longer than 1500. Address SCIENTIFIC CONTEST EDITOR, THRILLING WONDER STORIES, 22 W. 48th St., New York City, N. Y. The closing date is April 15.

JOIN THE LEAGUE

Have you joined the SCIENCE FICTION LEAGUE? It's an international organization composed of the world's most enthusiastic followers of science fiction—and it fosters that intangible bond between all science fiction readers. Just fill out the application blank provided on Page 119. There are members and chapters in every part of the globe—there are interesting get-togethers between members.

To obtain a FREE certificate of membership, tear off the name-strip of the cover of this magazine, so that the date and the title of the magazine show, and send it to SCIENCE FICTION LEAGUE, enclosing a stamped, self-addressed envelope.

And readers—write the editor of THRILLING WONDER STORIES a regular monthly letter. We want all your suggestions and criticisms. They are helping to make THRILLING WONDER STORIES the type of magazine you want.—THE EDITOR.

MOST POPULAR STORY OF THE MONTH

Here, in each issue to come, THRILLING WONDER STORIES shall announce the most popular story in the preceding issue. Novelette, short story, or short short—no matter what it is, your comments will decide.

February's favorite story, based on an analysis of all letters to the editor, was:

LIFE ETERNAL
A Novelette by
EANDO BINDER

Which do you consider the best science fiction story in this issue?

CHAPTER NEWS AND GENERAL ACTIVITIES

LOS ANGELES
December 2, 1937

At 9:30 P.M., after interesting period of informal discussion, meeting was called to order by Director Russ Hodgkins. Minutes of preceding meeting, including summary of lengthy debate, feature of the meeting, were read and approved.

Among the visitors were Neva Bradbury and friend, brought and introduced by member Ray Bradbury; Philip Fink, a fan recently from New York City; Leonard Adland; and Robert Lovelace. New member who supported our unofficial average of one per meeting was Wilbur F. Stimson.

At request of 4E Ackerman, a discussion was held regarding the future of the chapter organ, **Imagination!** He informed the club that more cooperative response to the enterprise was required to insure continued existence of the periodical, resulting in sufficient promises of service to enhearten somewhat those upon whose shoulders the work has been resting.

The recent address given by Eric Temple Bell at the Los Angeles Public Library, attended by several SFL members, was reported by member Hal Clark.

Remainder of the evening was given over to general discussion typical of our meetings, the assemblage finally breaking up without anticipating eagerly the second annual Christmas meeting scheduled for December 16.

May we again extend a cordial and fraternal invitation to all science fiction and fantasy fans, residing in and around the city of Los Angeles, to come to the Big Brown Room in the Clifton Cafeteria, which is situated on the N.E. corner of 7th and Broadway, on the 1st and 3rd Thursdays of each month. Meeting is usually called to order between 8:00 and 8:30 P.M..

Anyone desiring further information should address the secretary of the chapter: Perry L. Lewis, 309 So. Everett St., Glendale, Calif. For direct telephonic communication call Forrest J. Ackerman, FEDral 2231, Los Angeles Exchange. Anyone desirous of obtaining a copy of L. A. Chapter Organ, "IMAGINATION!", may do so by sending 10 cents to the above secretarial address.

QUEENS CHAPTER
November 7, 1937

The meeting was called to order at 3:35. The Secretary read the minutes and the report of the meeting that was sent to THRILLING WONDER STORIES.

Director Taurasi mentioned that Jack Gillespie, a prospective member of the Queens Chapter, had attended a meeting of the Washington Heights Chapter of the SFL and found that it met in YMHA each Wednesday. The Director was then appointed a committee of one to attend the next meeting of the W. H. Chapter and enlighten them as to the activity of the fan world, about which they were in ignorance.

Publishers of science fiction fan magazines that have seen at least one issue are asked to communicate with the QSFL, with a view to publishing a bibliography of extant amateur magazines.

This Chapter anticipates with pleasure the appearance of a sister magazine to THRILLING WONDER, and extends the publishers wishes for the success of such a worthy venture.

The name of the Queens organ was decided upon. It will be called JEDDARA, and for the sake of convenience, will be bound with issues of Taurasi's publication, COSMIC TALES. Except for the stapling, however, it will be an entirely separate magazine. (Since the last meeting, the first issue of JEDDARA has already appeared. It contains a complete report of the Third Eastern Science Fiction Convention held in Philadelphia on Hallowe'en, by William S. Sykora; "If Lear Had Been a S-F Fan" (limericks), by Robert G. Thomp-

son; and "Scientifilm Topics," by Richard Wilson, Jr. Future issues give promise of having a much larger content. Readers interested in the magazine are invited to send 5c to the Secretary, at 86-10 117th Street, Richmond Hill, N. Y., for a sample copy.)

The Secretary had written to the local radio station, WHN, asking about the Jules Verne radio play, "A Trip to the Center of the World," an adaptation for the famous s-f novel. He learned that the first part would be presented that Sunday. The production is under the direction of the WPA-Federal Theatre. The program was well received by the Chapter, since it follows the book faithfully, and is well acted.

Sykora then displayed a complete set of COSMOLOGY, the first known (and now rarest) science fiction club publication.

Wilson gave a resume of a fantasy film he had seen: "The Man in the Mirror," a British production. It was suggested, then, that if a member happened to notice that a new s-f film was playing, or if some old one had been revived, he would drop a card to each of the other members, so that they might attend the showing together.

NEW MEMBERS
UNITED STATES

Ralph Lodge, 39 Fiske Street, Waltham, Mass.; Kenneth Jones, 1916 North 40th, Oklahoma City, Oklahoma; John Swavely, Pine Forge, Pennsylvania; D. R. Maxfield, 137 Townsend, Grass Valley, California; Barnett Young, 5421 Washington Blvd., Chicago, Illinois; Edward Hewitt, 5487 Dahlia Dr., Eagle Rock, California; Edward J. Reilly, 402 Ferry Avenue, Niagara Falls, New York; Paul Anderson, Milton, Oregon.

J. Edley Fitz Water, 5114 Camden Street, Oakland, California; Ralph St. Aubin, Jr., 1127 Mason, Toledo, Ohio; Parmer Farrell, Tunica, Mississippi; Ronald Holmes, 52 Sanokeys St.,

(Concluded on Page 127)

APPLICATION FOR MEMBERSHIP
SCIENCE FICTION LEAGUE

Science Fiction League,
22 W. 48th St., New York, N. Y.

I wish to apply for membership in the SCIENCE FICTION LEAGUE. I pledge myself to abide by all rules and regulations.

Name .....
(Print Legibly)

Address

City

State Age....

Occupation Hobby.....

I am enclosing a stamped, self-addressed envelope and the name-strip from the cover of this magazine (tear off name-strip so that the name THRILLING WONDER STORIES and the date can be seen). You will send me my membership certificate and a list of rules promptly.

3-38

IN this department we shall publish your opinions every month. After all, this is YOUR magazine, and it is edited for YOU. If a story in THRILLING WONDER STORIES fails to click with you, it is up to you to let us know about it. We welcome your letters whether they are complimentary or critical—or contain good old-fashioned brickbats! Write regularly! As many of your letters as possible will be printed below. We cannot undertake to enter into private correspondence.

THE COMPANION MAG

By Paul H. Spencer

This is to let you know that I am with you one hundred per cent in the proposed companion magazine to THRILLING WONDER STORIES, and am willing to help you in any way I can concerning it.

I have often bemoaned the fact that no serials were published in T.W.S., since most really great science-fiction stories have been book-lengths. The opportunity to secure book-length novels complete in single issues of a new magazine is not to be passed up. However, let me advise you not to try to publish complete novels in each issue of the new magazine unless they are all good. Publish a few novelettes instead, and wait until a good novel comes along.

The large nine-by-twelve-inch magazine size has always appealed to me because of its more dignified appearance and opportunity for better illustrations, and I hope you use it with the proposed magazine.

If the magazine is ever put out, I would like to see Wesso do all its covers and Brown keep on doing the T.W.S. ones. As for interior illustrations, have them just as they are now—but try to get in Frank Paul.

Departments in the proposed mag? That, now, is a sticker! All I can think of are: a letters department, science questionnaire, and authors' biographies and photos. Try to include all of these, will you? Whatever you do, don't leave out the questionnaire.

Authors? Jack Williamson, Thomas Calvert McClary, John Taine, J. Harvey Haggard, Dr. Keller—and so on. And don't overlook the new authors—88 Ardmore Road, West Hartford, Conn.

(Mr. Spencer's pertinent pointers regarding a suggested companion magazine to T.W.S. are representative of the hundreds of requests we have received in response to our announcement. But we need more requests before we can be sure the majority of our readers favor the project. All readers interested in such an idea are urged to drop the editor a postcard saying: "I want a new science fiction magazine." Many thanks to those who have already written us so.—Ed.)

CORRECTION

By Ralph Milne Farley

For the sake of my and your mathematical reputations, will you please print this letter in your next issue. My novelette, "A Month a Minute," contains two rather serious mistakes.

On page 16, the words 'coordinated axis" should of course be "coordinate axes." And on page 24, when one multiplies the equation $t = is$ through by i, one of course gets $it = -s$, rather than $it = s$. Without the minus sign, the equation would not represent "going backward along one's world line in space-time."—1265 Fairview Avenue, South Milwaukee, Wisconsin.

(Errata noticed, suh. And it'll be hoss pistols at dawn behind the little red barn if Einstein finds some more.—Ed.)

BROWN'S BEST

By John Chapman

Brown's February cover is easily the best he has done for T.W.S., despite the fact that he once more insisted upon bringing Saturn in among the terrestrial planets. The blue ship is excellent, however, and Mars is convincingly drawn. More Wesso in this corner, please.

Story honors go to Gile's "Via Asteroid." This is an interesting series, well done and original. Let's have more of this type. "Zones of Space" didn't live up to expectations, but just the same it was good. "The Changer of History," by Alexander Samalman, was excellent. I vividly remember Samalman's short-short in one of your companion magazines some time ago, "Across the Table."

A large-sized companion magazine would be the turn of a new science-fiction era. If science-fiction is to be spread to any noticeable degree, nothing can influence it more impressively than a magazine that doesn't repose among melodramatic stories of super heroes and sizzling bullets. There is little doubt that T.W.S. followers would support a companion publication. More than that, it would bring back the old-timers who have laid down their pens with the belief that science-fiction is on its last mile.

I like the idea of naming the most popular story in the previous issue. It's another of the interesting departments you are constantly adding to the magazine.

The line-up for the April issue looks good. Jack Williamson is always welcome, and the return of Clark Ashton Smith is alone worth two months of waiting.—1521 Como Ave., S.E., Minneapolis, Minn.

SPEARING SPEER

By P. E. Cleator

Your correspondent, Mr. Jack Speer (writing in this column, December, 1937 issue) rightfully resents, in my article, "Spaceward," the reference to the Almeria reprisals in the Spanish Civil War. I hasten to offer due apologies, as in duty bound. I feel, moreover, that his timely protest deserves an explanation.

It happened thusly: On July 28, 1936, I received an invitation from the editor of THRILLING WONDER STORIES to write an article on space travel, which I accepted forthwith. But when I picked up my pen to write, inspiration, alas, had fled. So I entered my time machine (a present from H. G. Wells) and journeyed into the future, athirst for information and ideas. It chanced that I caught up with the evening papers of May 31st, 1937, and read therein a lurid account of the Almeria reprisals, carried out that very morning. After making copious notes, I journeyed back in time to July 28, 1936, began the writing of the article, and duly consigned it to the care of the postal authorities on August 29th, 1936.—34 Oarside Drive, Wallasey, Cheshire, England.

(Did Wells really give you his time machine? Can you get him to write a yarn for us?—Ed.)

OUR CREDITOR

By Doc Lowndes

In order to give you credit where such credit is due, one must admit, without reluctance, that the February, 1938 issue of your alleged science fiction magazine is better than the February, 1937 issue of the same, and that there has been a tendency toward improvement during the past year. The cover on the new issue is almost worthy of congratulations; far above Brown's usual level of pot-boilers disguised as space ships of science fiction. Despite his usual placements of Saturn where Saturn might possibly be on a magazine cover, but hardly anywhere else in such a scene, this drawing does warm the cockles of a s-f fan's heart a bit. And the white background is very good, even if scientifictionally inaccurate.

Credit is also due you for having disposed of the Sunday supplement cartoon-story, and for improved inner art-work.

May one suggest, though, that instead of trying to slaughter insomniac nights by thinking up new departments for the magazine you make a real department out of THE READER SPEAKS. True, it is a trifle larger this time, but by no means large enough. And is there any reason why you can't have editorial comments after each letter? That is one thing that could always be said in favor of the old Wonder. No matter how bad the stories, or most of them, were in one issue, THE READER SPEAKS was always worth buying the issue for. There was a column that kidded and cajoled and cussed and discussed and went to town

(Continued on Page 122)

(Continued from Page 121)

generally. One could always overlook editorial faults because, despite some of the wonderful blunders they made, no one could say the magazine wasn't alive.

As it stands now, dear old T.W.S. is blundering along gaily, slipping in a good tale now and then, but THE READER SPEAKS department is sadly lacking. You do have a sense of humor, as shown by your printing of such tales as "Liquid Life," "Space-Time-Size-Machine," "Penton & Blake, Inc." etc., and you seem to have a vague idea of what is good science fiction. Besides, just between the umpty-thousands of us, T.W.S. isn't hideous unless one expects too much. Why not try it now? Why not let the reader's column cover four or five full pages, or the equivalents thereto, and add your own bits of wit, wisdom, and witality to it? You have some, I suppose.

As to the question of a new magazine, here's one all for it. I'd like to see a large-sized magazine on the stands again, but then, if it is uniform with T.W.S. it'll be better for filing. But at any rate, let's have it. The more magazines, the more stories you'll have to print, and the more you do print, the bigger chance of getting something good now and then. You can't pick bad stuff all the time.—Greenwich Hospital Ass'n, Greenwich, Conn.

(So we can't pick bad stuff all the time? How about this letter? As for increasing the number of letters in THE READER SPEAKS, to do so would mean publishing them in this type. Who's in favor of it?—Ed.)

CONSUMER'S REPORT

By Gerry Turner

The February issue is of "B" rating, quite satisfactory in general, but lacking any "master touch." Even the magic of Sir James Jeans' name fails to cause me to consider his article other than a fairly diverting piece, evidently dashed off in a few spare moments.

In "Life Eternal" authors Eando Binder has taken a plot, definitely huge in scope, and attempted to compress it into fifteen pages. As a result, this fine idea is wasted, for the result reads more like a synopsis than an actual story. "Life Eternal" would have made a powerful book-length novel.

I notice in the forecast of this issue that Henry Kuttner is offering "Hollywood on the Moon." For five months I have been trying to compose an original yarn myself, but always someone beats me to it. I have just consigned my latest effort to the waste-basket, fully complete, for alas, it too deals with the adventures of a motion picture company in outer space! A few months back "Red Shards of Ceres" snatched my hopes for originality away, after I had written some nine thousand words. I have a brand-new idea in mind now, and I am at present engaged in writing it. I'm almost getting to believe that these authors have perfected mental telepathy!—Hotel Bretton Hall, New York City, N. Y.

(So our authors have scooped you on two story plots through the medium of some strange psychic affinity. We flunk you.—Ed.)

FLAW-FINDER
By Mark Reinsberg

Going straight to the point—look at the Feb. cover! Of all the ———. The perspective is terrible. Compare the space ship (which delayed the next eclipse by one hundredth of a second) with Mars. Notice the dense clouds of smoke coming from the poles. According to the picture the smoke must be high in the stratosphere and smoke just simply does not go that high. It does not m ntion anything about smoke in the story. Besides, I didn't know that there was oxygen enough on Mars to support combustion.

Eando Binder's "Life Eternal" was a fine yarn. I do not see how Mercury cou d be made more habitable by rotating once in eighty hours, indeed less so. Baked for forty hours, frozen for forty hours—hardy people, these pioneers. Five years to clarify the atmosphere of Venus, ten for Jupiter, and two years for Saturn! Anton York must be going in for things on a big scale. Why, any author could have made a story out of each one of those feats, much less cramming them into one story. I also beg to differ on the time taken to do those things. Mighty man, Anton York.

I rank "Dream Dust from Mars" as number one of this month, with "Life Eternal" second. "Zones of Space" gets the prize for the most original plot. I enjoyed Sir Jeans' article immensely and find Jack Binder's IF very thought-provoking.—430 Surf St., Chicago, Ill.

STAR STORIES
By Ralph Lodge

Being a fairly new member of your ever-growing circle of followers, for I have only read your magazine since the last three issues, I have undertaken the task of complimenting you and giving out one or two suggestions, as you have asked all readers to do. In my opinion you have an excellent magazine and some fairly good stories, although, I must admit that some stories are exceptionally well written.

"Life Eternal" and "Zones of Space" by Binder and Sheridan respectively may be counted as star stories. I'm not commenting on the other stories, but that doesn't mean that they weren't good. The articles IF and SCIENTIFACTS are also fine. THE STORY BEHIND THE STORY also demands praise.

As for suggestions, make your covers more like the June, 1937 and February, 1938 issues. Leave out people's figures and in their place put new machines, rockets, worlds, inventions, or something that is going to be used in the story. Secondly, don't ever think of putting out a quarterly T.W.S. It's tough enough now to wait for the magazine. If you do anything, get a lot of good authors together and start a monthly.—39 Fiske St., Waltham, Mass.

(Continued on Page 124)

(Continued from Page 123)

COMPANION MAG AGAIN

By James S. Avery

In the February issue of THRILLING WONDER STORIES you printed the most startling announcement ever to rock science fiction history since 1936. Ever since your first issue over a year and a half ago, the cry of your readers has been either for T.W.S. to go monthly, or for a companion magazine. Now we have a promise of one.

At any rate, place my name on the list of those clamoring for a large-sized companion magazine to T.W.S., to come out on alternate months, January, March, May, etc. Devote it to novels by such time-honored favorites as Dr. Keller, Harl Vincent, Clark Ashton Smith and other great names of a few years back. And above all, make an attempt to get Paul as your star artist.

That seems to voice my opinion on the prophesied mag. And while I'm about it, I might as well give a brief review of the February issue. The best story of the month was of course the Binder opus, "Life Eternal." I wasn't particularly impressed by "Zones of Space," though it was a good tale with a new plot.

Your contents page tops that of any other magazine in the field. A very neat and well-balanced make-up. The Feb. cover was extremely unusual, but tell me, was it Brown? (Right.—Ed.) The white background is unique for a science fiction magazine.—55 Middle Street, Skowhegan, Maine.

FIRST LETTER

By William Simmons

I am 16 years of age, and have been reading science fiction for several years. I have found T.W.S. the best of them all. This is my first letter; I hope it is accepted.

Having just finished the December issue, I find that ZARNAK has been eliminated at last. That feature belonged in Grimm's Fairy Tales, not in science fiction. I enjoyed "The Tenth World" by Campbell. Keep up the Penton and Blake series, please. Williams' "Beyond That Curtain" is good; I like surprise endings. An interesting story is "When Space Burst," by Edmond Hamilton.

The article, "Eight Days in the Story of Rocketry" is excellent, very good reading. Willy Ley, in my estimation, should write more often on this subject for T.W.S. I see Sir James Jeans on the menu with an article on astronomy in the next issue. Am looking forward to it. I think SCIENTIFACTS should be expanded to at least four pages. The feature IF by Jack Binder is tops! IF should be enlarged to two pages. This article is novel and educational—more power to it!

SCIENCE QUESTIONS AND ANSWERS has 10 questions in the Dec. issue. This is just enough to make it enjoyable. What has happened to Eando Binder? He is my favorite author. How about more of Kline, Haggard, Giles and Zagat?—3324 Beach Ave., Chicago, Ill.

CANDID CAMERA CATCHES CO-EDS IN

THE STORY BEHIND THE STORY

(Continued from Page 6)

in another universe. But where find room for a new universe? Dirac and Anderson came to the rescue.

For the minute historic streak that Anderson observed was the trail of condensing vapor left in the ionized track of a positron. That elusive particle, never observed before, had been predicted by the mathematical genius of Dirac—a pencil-and-paper feat as remarkable as that of Adams and Leverrier in discovering Neptune.

Dirac's conceptions of negative mass and negative energy, thus so amazingly verified, seem as fantastic as any science fiction plot. The more power you apply to drive a particle of negative mass in one direction, the greater its velocity in another!

It was the now famous "Dirac hole"—which has been defined as the **want** of a particle which is negative of mass and of charge, and identified as the positron—that suggested the **minus** universe of the story, which became the abode of the infinite entity.

The infinite possibilities of life have always been, to me, a favorite topic of speculation. They must be, I think, to any living—and speculating—being. There is a kinship between the animistic savage who attributes life to rocks and winds, and Sir James Jeans, who sees the hand of a Mathematician in the structure of the Universe.

And the potentialities of life are, literally—infinite!

INSECT CONQUEST

DO YOU want to be an author? Do you want friends to look at you with awe in their voices and exclaim about you breathlessly: "He writes!"? Then all you should do is pick yourself a number from the telephone directory, go on picnics, and sip some fizz-water. It may sound pretty easy, as you will gather from reading JOHN RUSSELL FEARN'S letter below, but we suspect it's not such simple work.

There's plenty of thought behind LORDS OF 9016, Fearn's novelette of domination of the Earth by giant insects. In addition to the grim picture of insect conquest portrayed by the author, the story brings up an interesting discussion on time-traveling. We feel certain the work involved in creating LORDS OF 9016 was not as effortless as the following letter indicates:

I believe I can blame a summer picnic for LORDS OF 9016. It happened toward the close of last summer when, drowsy with sunshine and the sandwiches all finished, I found myself gazing at the tireless activity of a nearby army of ants.

I called the attention of my friend to their energies—their untiring efforts to drag a dead match I had discarded toward some place better known to them than to me.

As I watched them I could not help but recollect the numberless stories in science fiction that have been written concerning ants. For a while I toyed with the idea of just another ant story, with a few helpful suggestions from my friend by the way. It was no good, though—I just couldn't get a novel slant. Ants and their habits were all washed up so far as I was concerned.

Then, after a bottle of fizzwater had been disposed of, I began to gather certain drifts. Maybe it was the effect of that mineral. I shall never know, but I do know that I began to wonder if ants in the future would ever turn carnivorous and if they did what a high old time they could give we unfortunate humans.

(Continued on Page 126)

(Continued from Page 125)

Visions of a butcher's well stacked shop on my way home lent another angle. If ants became life size they might treat humans as we treat cattle, not from cruelty but from necessity. So, by degrees, the thing matured.

I was still stuck though. Then that evening I had reason to telephone another friend to come over and join me, and his number was nine-oh-one-six—ninety sixteen, as I had always remembered it. It always fell from the lips so smoothly I rather liked that number. So much so I got to dwelling on it as a possible period when my theoretical ant life might reach maturity.

So out of that picnic, a butcher's shop and a telephone number, there emerged the terrifying Lords of 9016, who had long tunneled the Earth for their own purposes. I felt that perhaps the new slant of bringing them from future time to present time might get over the obvious oldness of the basic idea.

True, I took liberties with time travel; to embody my **main** objective I had to leave much to the imagination in the time travel art. It was not written as a time tale but as a theory on what might happen if the ant does evolve in the far future to becoming man's most deadly enemy.

I sincerely hope we'll not be there when it happens. I should hate to meet an ant on a dark night.

THE DECLINE OF CIVILIZATION

CLARK ASHTON SMITH has been missing from the pages of THRILLING WONDER STORIES for quite some time. But we've brought him back at last, and we hope his story in this issue, THE DARK AGE, is the forerunner of many more to come. Clark Ashton Smith's followers are legion, and no wonder. His literary style is distinctive and as forceful as some of the writings of the late H. P. Lovecraft, who, incidentally, was a very intimate friend of Smith.

There is nothing we can say about the theme of Smith's story. His own comments speak ably for themselves.

THE DARK AGE was written to illustrate how easily scientific knowledge and its resultant inventions could be lost to the human race following the complete breakdown of a mechanistic civilization such as the present one. The tale seems far from fantastic or impossible; and I have tried to bring out several points and to emphasize the part played by mere chance and by personal emotions and reactions.

I have shown the old knowledge conserved by a select few, the Custodians, who, in the beginning, are forced to isolate themselves completely beoause of the hostility displayed by the barbarians. Through habit, the isolation becomes permanent even when it is no longer necessary; and with the sole exception of Atullos, who has been expelled from the laboratory-fortress by his fellows, none of the Custodians tries to help the benighted people about them.

In the end, through human passion, prejudice, misunderstanding, the Custodians perish with all their lore; and the night of the Dark Age is complete. The reader will note certain ironic ifs and might-have-beens in the tale. Other points that I have stressed are the immense, well-nigh insuperable difficulties met by Atullos in his attempt to reconstruct, amid primitive conditions, a few of the lost inventions for the benefit of the savages; and the total frustration of Torquane's studies and experiments through mere inability to read the books left by his dead father.

Also I have shown how a chemical, such as gunpowder, might be used by one who had learned its effects but was wholly ignorant of its origin and nature.

SCIENCE FICTION LEAGUE

(Concluded from Page 119)

Liverpool 4, Lancs; Jim Miller, 220 So. Grove, Wichita, Kansas; J. P. Oyer, R.F.C. Sta., P. S., N. Y., Bremerton, Washington; Walter Sullivan, 10146-112 St., Richmond Hill, New York; Dan Ashland, 1322-11th Avenue, So., Escanaba, Michigan; George Swankie, 1005 Griswald, Sharon, Pennsylvania; John M. Hollanos, 124 Grape Street, Buffalo, New York; Henry Mitchel, 411½ S. Oakes, San Angelo, Texas; Lew Cunningham, Box 115, Calexico, California.

John Tasch, 312-69th Street, Brooklyn, New York; Fred D. Boyette, 415 E. Church Street, Jacksonville, Florida; Corrine Gray, 3430 Lan Franco, Los Angeles, California; Carl Guelso, Jr., 5619 N. Spaulding, Chicago, Illinois; Jack Sheryl, 1162 Sherman Avenue, Bronx, New York; Don Gunn, 1615-13th Street, Oakland, California; Wm. C. Gest, The Mayflower Hotel, Akron, Ohio.

Randolph Foster Robinson, 609 South Denver Street, Tulsa, Oklahoma; Harold F. Keating, 34 Arnold Street, Quincy, Massachusetts; Jim Wheeler, 508 Patton Avenue, Jeannette, Pennsylvania; Edgar Dietrichstein, 2436 Virginia Park, Detroit, Michigan; Wm. C. Horning, 5 E. Liberty Street, Cincinnati, Ohio; Ralph F. Nick, Company F., Sixth Engrs., Fort Lewis, Washington; Vita Cali, 217 Chrystie Street, New York City, New York; Walter Kubilus, 378 Hooper Street, Brooklyn, New York; R. S. Balland, 4525 Drexel Blvd., Chicago, Illinois; John F. Nolan, 141-25 Northern Blvd., Flushing, Long Island; Leonard Westhoek, Box 239, Plymouth, Michigan; Leslie Chappell, Jr., 6416 S. Warner Street, Tacoma, Washington; Wallace C. Ellerbroek, College Court A, Sioux City, Iowa; James B. Smith, 140 Grant Avenue, Jersey City, New Jersey; Raymond Wilson, 1221 Washington Street, Wilmington, Delaware; Charles Weaver, 723 South Shore Rd., Absecon, New Jersey; Arthur Saha, 5 W. 4th Street, Duluth, Minn.

FOREIGN

E. F. Denton, Westport, Digby Co., N. S.; Brian Bolger, James Street, Paddington, Brisbane, Queensland, Australia; N. L. Wilson, 118 Lucas Street, Shadwell, E. 1, London, England; Henry Boernstein, 1071 Mount Royal Blvd., Montreal, Canada.

E. W. Fay, 5 Spinners Wk., Windsor, Berks, England; Paul H. Ruest, 213 Notre Dame Street, Sudbury, Ontario, Canada; Yasuro Isuda, 316 Jackson Avenue, Vancouver, N. C.; William Roy Jarvis, 22 Waterloo Street, Plymouth, Devon, England; S. Grigson, Esq., 29, Malvern Road, Hampton-On-Thames, Middlesex, England; Percival A. Bones, Esq., c/o Cotswold Cads Club, 6 Forest Glade, Leytonstone, England; Ferd Diewert, Box 582, Duncan, V.I., B. C.; David Watson, 134 Kingsbridge Dr., Glasgow S. 4, Scotland; Gert du Toit, c/o S. A. R. Middleburg, Trl., South Africa.

RAYS OF BLINDNESS

(Continued from Page 113)

speed of light. Now it was simply a matter of tuning so that the radio waves would carry the static charges to the great height necessary.

Harper stood by nervously as Chandler manipulated the controls. There was nothing more he could do. His sharp ears detected every slightest change in the whine of the apparatus. He heard the deep hum of the powerful dynamo that was supplying power. The soft hissing of energy that leaped the gap between grid and plate in the tubes. The click of a relay.

"All set," breathed Chandler. "Here goes!"

Harper held his breath. He heard the sudden crackle of titanic energies pulsing through the machine. Outside, from the aerial, must be leaping a powerful surge of long radio waves, dragging with them the key that would unlock the atomic stores of energy in the atmosphere of hydrogen more than a hundred miles up. Harper strained his eyes as if to read the dials that would indicate whether the experiment was successful or not. There was no guarantee that it would be.

Harper listened to the subtle noises for as long as he could stand it. "Burt!" he called hoarsely at last, after an hour. "What do the meters read? Burt, tell me!"

Harper heard a long-drawn breath from the young scientist. He felt his hand on his arm. "I think it's working, sir!" he said, his voice trembling with strain. "The radio beam is unloading at one hundred and fifty miles height, where the Appleton layer is at present. The absorption spectroscope shows a distinct shift of intensity from the ultra-violet end toward the infrared. That means atomic energy is being born up there in the hydrogen layer. And the seventh octave rays are already dying out!"

A while later his voice burst out triumphantly.

"Look, sir, look! The spectroscope —not a shred of seventh octave radia-

tion is coming through! It worked! The tritium layer has been formed overhead and will spread through all the atmosphere in a few hours. The blinding rays of the seventh octave are stopped cold! Look at the spectroscope!"

The hysterical young scientist had forgotten, in his excitement, that he was speaking to a blind man. Harper shook his head slowly, smiled. He didn't mind, now, that he could not see. His happiness was complete.

Perhaps a god, looking down on Earth that day, might have seen a cosmic irony in the fact that a blind scientist had saved the eyesight of all men of Earth. But it wasn't ironical to Thaddeus Harper. He was too deliriously happy to be ironic.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, of Thrilling Wonder Stories, published bi-monthly at New York, N. Y. for October 1, 1937.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared N. L. Pines, who, having been duly sworn according to law, deposes and says that he is the Publisher of Thrilling Wonder Stories, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher, Better Publications, Inc., 22 West 48th Street, New York, N. Y.; Editor, Harvey Burns, 22 West 48th Street, New York, N. Y.; Managing Editor, none; Business Manager, H. L. Herbert, 22 West 48th St., New York, N. Y.

2. That the owner is: Better Publications, Inc., 22 West 48th Street, New York, N. Y.; N. L. Pines, 22 West 48th Street, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of the total amount of bonds, mortgages, or other securities are: none.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders, who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

N. L. PINES, Publisher.

Sworn to and subscribed before me this 30th day of September, 1937. Robert A. Pape, Notary Public, commission expires March 30, 1938.

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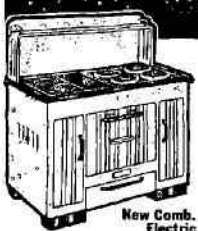

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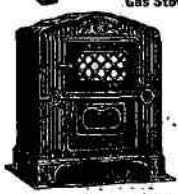

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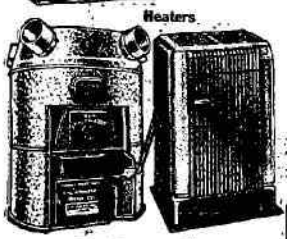

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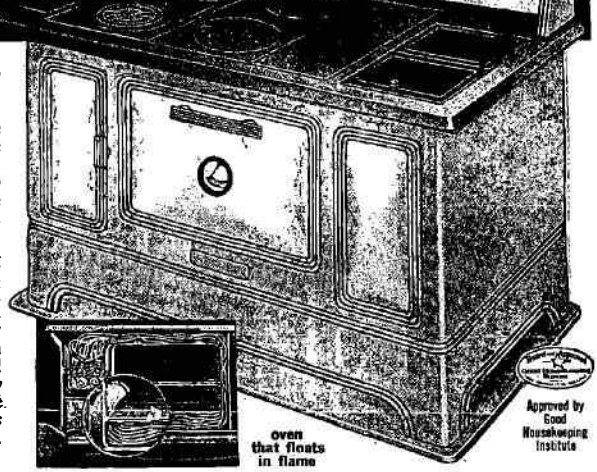

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