

ASTOUNDING

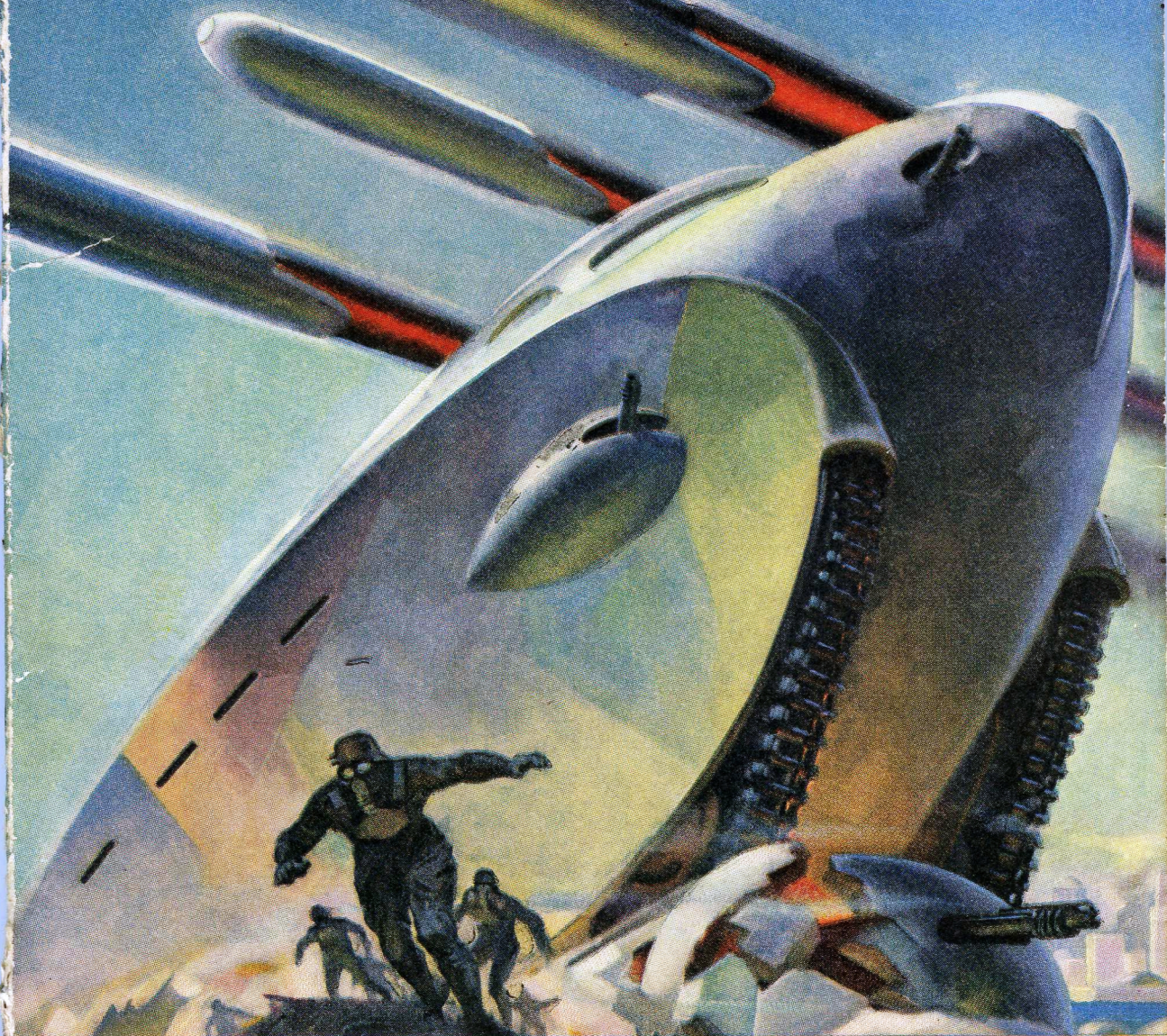
FEB. '40

SCIENCE-FICTION

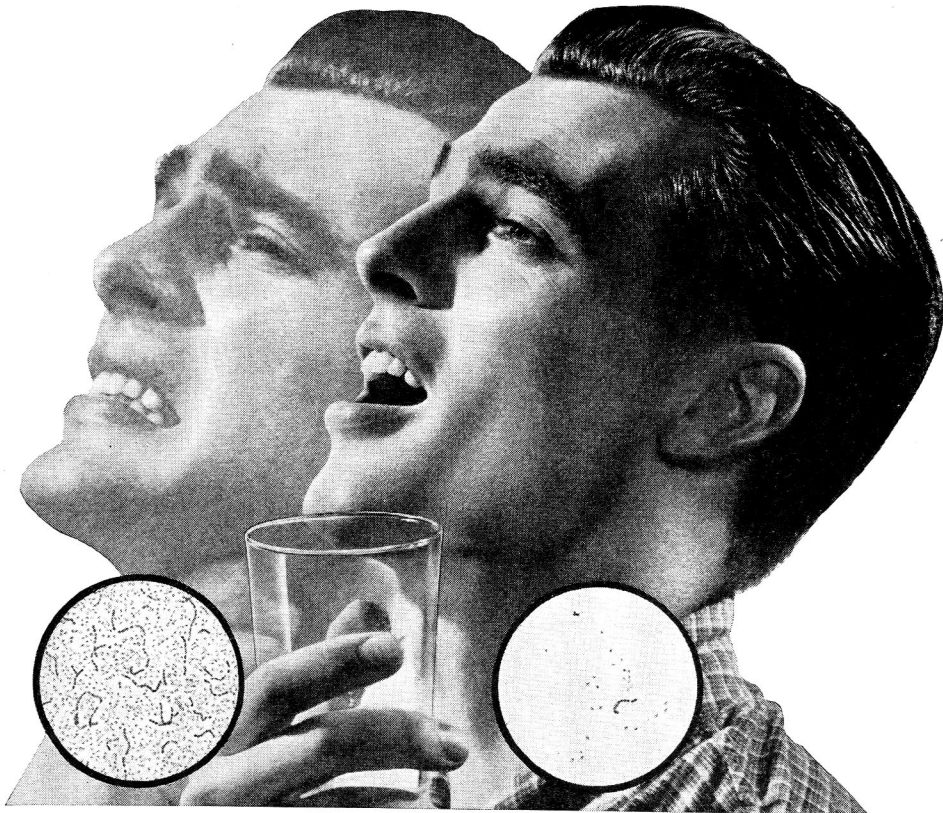
20¢

A STREET & SMITH PUBLICATION

FEB. 1940



"If This Goes On..." by Robert Heinlein



NOTE HOW LISTERINE REDUCED GERMS: The two drawings above illustrate height of range in germ reductions on mouth and throat surfaces in test cases before and after gargling Listerine Antiseptic. Fifteen minutes after gargling, germ reductions up to 96.7% were noted; and even one hour after, germs were still reduced as much as 80%.

AT THE FIRST SYMPTOM OF A COLD OR SORE THROAT—

Listerine quick!



Listerine Antiseptic reaches way back on the throat surfaces to kill "secondary invaders" . . . the very types of germs that make a cold more troublesome.

This prompt and frequent use of full strength Listerine Antiseptic may keep a cold from getting serious, or head it off entirely . . . at the same time relieving throat irritation when due to a cold.

This is the experience of countless people and it is backed up by some of the sanest, most impressive research work ever attempted in connection with cold prevention and relief.

Fewer Colds, Tests Showed

Actual tests conducted on all types of people in

several industrial plants over 8 years revealed this astonishing truth: That those who gargled Listerine Antiseptic twice daily had fewer colds and milder colds than non-users, and fewer sore throats.

This impressive record is explained by Listerine Antiseptic's germ-killing action . . . its ability to kill threatening "secondary invaders" — the very types of germs that breed in the mouth and throat and are largely responsible, many authorities say, for the bothersome aspects of a cold.

Germ Reductions Up to 96.7%

Even 15 minutes after Listerine Antiseptic gargle, tests have shown bacterial reductions on mouth and throat surfaces ranging to 96.7%. Up to 80% an hour afterward.

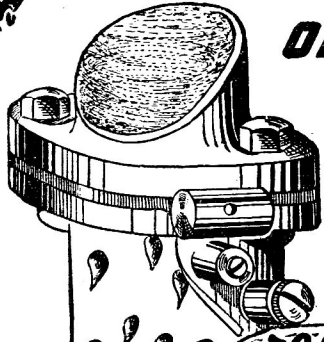
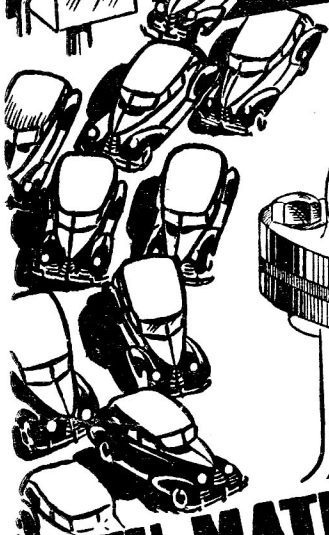
In view of this evidence, don't you think it's a sensible precaution against colds to gargle with Listerine Antiseptic systematically twice a day and oftener when you feel a cold getting started?

LAMBERT PHARMACAL COMPANY, St. Louis, Mo.



Calling All Cars!

A MYSTERIOUS DISCOVERY SAVES UP TO 30% ON GASOLINE! OR COSTS NOTHING TO TRY



VACU-MATIC SETS NEW COAST-TO-CHICAGO RECORD

Scores Again

Answer this call! Investigate this remarkable discovery that trims dollars off gasoline bills—gives you worthwhile gas savings—more power—greater speed—quicker pickup—faster acceleration. Proven so efficient, it is guaranteed to save up to 30% and give better performance or the trial costs you nothing.

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Vacu-matic is *entirely different!* It operates on the supercharge principle by automatically adding a charge of extra oxygen, drawn free from the outer air, into the heart of the gas mixture. It is entirely automatic and allows the motor to "breathe" at the correct time, opening and closing *automatically* as required to save dollars on gas costs.

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The distance covered was 2322 miles in thirty-nine hours and forty-two minutes, officially timed by Western Union, which gave me an average speed of 59.7 M.P.H. based on elapsed time and with the Vacu-matic averaged 13-1/2 miles per gallon on gasoline.

Returning leaving Los Angeles, we made several test runs both with and without the Vacu-matic, and the tests proved that Vacu-matic increased my gas mileage 3-1/2 miles per gallon at the driving speed of 30 M.P.H. and also very noticeable increase in both acceleration and power.

Yours very truly,
Bob McKenzie

In addition to establishing new mileage records on cars in all sections of the country, the Vacu-matic has proven itself on thousands of road tests and on dynamometer tests which duplicate road conditions and record accurate mileage and horse power increases.

You, too, can make a road test with Vacu-matic on your car and prove its worthwhile gas savings to your entire satisfaction.

Learn all about this remarkable discovery. Get the facts NOW!

Fits All Cars Easy To Install

Vacu-matic is constructed of six parts assembled and fused into one unit, adjusted and sealed at the factory. Nothing to regulate. Any motorist can install in ten minutes. The free offer coupon will bring all the facts. Mail it today!

The Vacu-matic Co. Wauwatosa, Wis. AST-1

Sworn Proof of Gas Savings

This certifies that I have carefully read 300 original letters received from Vacu-matic users testifying to gas savings up to 30%, many reporting added power, smoother running, and quicker pick-up. These letters are just a small part of the larger file of enthusiastic user letters that I saw at the company offices.

Signed *Maxwell J. Blau*
Notary Public

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7617-490 W. State St., Wauwatosa, Wis.

Please send full particulars about VACU-MATIC, also how I may obtain one for my own car FREE. This does not obligate me in any way.

Name

Address

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

Check here if interested in Agency Proposition.

ASTOUNDING

SCIENCE-FICTION

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VOL. XXIV NO. 6

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IT ISN'T A SCIENCE—YET!

ROBERT HEINLEIN, in his "If This Goes On—," presents a civilization in which mob psychology and propaganda have become sciences. They aren't, yet—and maybe Americans can be as thankful for that as for their two great and good friends—the Atlantic and Pacific oceans. (The Pacific merits the name; it does more to enforce pacific intention than any other thing on Earth, being the widest.)

Psychology isn't a science, so long as a trained psychologist does—and must—say "there's no telling how an individual man will react to a given stimulus." Properly developed, psychology could determine that; the corollary is that it could then select the precisely correct stimulus to bring forth any desired reaction. This would, unquestionably, make for a far more orderly world, this ability to select the right push-button in a man's mind, and make him react as dependably as any other machine.

Unfortunately, an insane man is one who sees things—the world, the Universe, his fellow men—in a way different from that seen by the rest of the world. Now that means two possibilities; he may be wrong, or the world may be wrong. If he's wrong, he goes where he'd do the least harm to the world. If he's right and the world's wrong, he goes to a university and becomes another Einstein or Newton.

But if psychology were a real science, able accurately to control the immaterial "material" of its study, there'd be a rather strong tendency to decide first that, since one man says the regiment is out of step, the one man needs a few psychological push-button stimuli readjusted.

It would make for an infinitely more orderly world, such psychology of the individual, and propaganda, which is the psychology of the mass, but someone, or some organization, is going to make the decisions as to whether the world or the man is wrong.

With properly developed psychology and propaganda, we'd have no lost minds, we'd have far more order—but we might, of course, have even more and more vicious wars. For only a true God could decide always correctly, always justly, and without prejudice.

Because, naturally, if you have a human, or group of humans, doing the deciding—a really good psychologist would, by the very action of his science, be able to make *them* react to selected stimuli in a selected way!

And he might be right, and the world wrong, or the other way round. But nobody would know, by that time. The world would have been made to agree with him heartily.

THE EDITOR.



BRASS TACKS

Stuart's in retirement. But Astounding or Unknown will get his stuff if anyone does.

Dear Editor:

I might find something pleasant to say somewhere near the end of this letter. And I might not.

Starting with illustrations: That cover—*gr-r-r-r*. You're going to get plenty of kicks on that, I'll bet. Gilmore is worse than Gladney. Orban is a cartoonist—and his drawings for Van Vogt's excellent story look like a reject from the funny pages.

Stories: I'm not going to list them, but Van Vogt's "Discord in Scarlet" is truly outstanding. Schachner and Smith fight hard for last. Smith, I believe, cops the honor because his story is longer. (He would be a swell author if his plots weren't so much hash. He has a wonderful command of English.)

Departments: Editor's page—excellent. Readers' pages—interesting, well thought out, humorous. Analytical Laboratory—good for a laugh any time. I don't see how you manage to give us such a good mag when the majority of readers are half-witted. I began to suspect it long ago when they rated Wandrei so high—when Lovecraft received such an unmerited panning—when Don Evans' "The Last Hope" failed to place first. *Tsk, tsk*. Placing "Shawn's Sword" and "Rust" last. Indefensible. "Rust" was almost as good as Robert Moore Williams' poetic "Robot's Return." (Come to think of it, that wasn't received well, either, was it?)

Authors: Don A. Stuart is first by a large majority. C. L. Moore second, and Lester del Rey third. Don Evans, L. Sprague de Camp, L. Ron Hubbard, Harry Bates, and a few others. Why not some stories by Clark Ashton Smith in either *Unknown* or *Astounding*?

Had an interesting experience the other day you might like to hear. No? Fine, here goes. A friend of mine, it developed, is an inveterate science-fictioneer. From way back. However, he claimed that it was all fantasy, and said he could pick an error in the science of any story I would care to name. Hm-m-m. What would you pick? Anyway, I decided that Weinbaum was about tops and thought I would have some fun by mentioning the Red Peri.

Well, believe it or not, the fellow not only remembered the entire plot, but picked unerr-

ingly on a part I had completely forgotten—the wall of energy that kept the atmosphere in the cave. He proved that such a force screen was not only impossible, but even if it would work, it would break down the atmosphere it was protecting.

On second thought, couldn't you give us more of Don Stuart? Please? "Forgetfulness" was just about perfect.—Lawrence Miller, 2740 Vincent Avenue, Norfolk, Va.

Williamson has a novel coming up in Unknown.

Dear Mr. Campbell:

Like many others I had an impulse to write a rave letter when the October number came out. I'm glad I waited. Good as the October issue was, it is totally eclipsed by the December copy. Great Kiono himself couldn't have done better. Which brings me to Smith's unparalleled "Gray Leusman." It is superb! And how I hate the thought of waiting two years for another sequel. When it does come, I'd like to see the Arisians run up against some really formidable opposition: something that would almost match even their mighty intellects. The interlude between Eichlan and Eukonidor gives you just an inkling of the dramatic potentialities of such a conflict. However, I shall venture no farther than merely making the suggestion, humbly leaving the details to Dr. Smith.

I agree somewhat with A. A. Smith of Kingston, Ont., in that Weinbaum's stories have been matched personality for personality by Dr. Smith. However, these two are not alone on their pinnacle. Williamson's Legion sagas belong in the same roster, and one or two of his yarns that have not appeared in *Astounding* are every bit as good. His incidents may not be as cataclysmically gargantuan as Smith's or as subtly flawless as Weinbaum's, but his style is as unique as either and clearer and more comprehensible by far than Smith. Jack Williamson's stuff has an easy, racing greatness about it that has never been duplicated in science fiction. His knack for naming characters is unmatched, his plots are varied, indeed, and peopled with entities and creatures that never cease to fascinate. He is, in short, my favorite fantasy author.

Getting on to other things, A. E. van Vogt's

Continued on page 157

HE THOUGHT HE WAS LICKED - THEN A TIP GOT BILL A GOOD JOB!



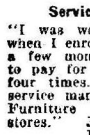
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"When I completed 20 lessons, I obtained my Radio Broadcast Operator's license and immediately joined Station WMPC, where I am now Chief Operator."

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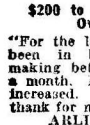
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The day you enroll I start sending you Extra Money Job Sheets which start showing you how to do Radio repair jobs. Throughout your Course I send plans and directions which have helped many make \$200 to \$500 a year in spare time while learning. I send

special Radio equipment to conduct experiments and build circuits. This 50-50 training method makes learning at home interesting, fascinating, practical. I ALSO GIVE YOU A MODERN, PROFESSIONAL, ALL-WAVE, ALL-PURPOSE SET SERVING INSTRUMENT to help you make money fixing Radios while learning and equip you for full time work after you graduate.

Find Out What Radio Offers You Act Today! Mail the coupon for my 64-page Book "Rich Rewards in Radio." It points out Radio's spare time and full time opportunities and those coming in Television; tells about my course in Radio and Television; shows many letters from men I have trained, telling what they are doing and earning. Read my money back agreement. MAIL COUPON in an envelope, or paste on a penny postcard—NOW!

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Dept. OAD, National Radio Institute
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Any insurance company has records of hundreds of them—records kept for their own protection. Statistics show that if an "accident prone" is given a job driving a truck—people get maimed or killed—suits pile up—yet the driver never does anything wrong.

Accident prone exist! Are they, as the author suggests, "DEATH'S DEPUTIES"? This story, founded upon fact, is but one of several features that will thrill you in

FEBRUARY



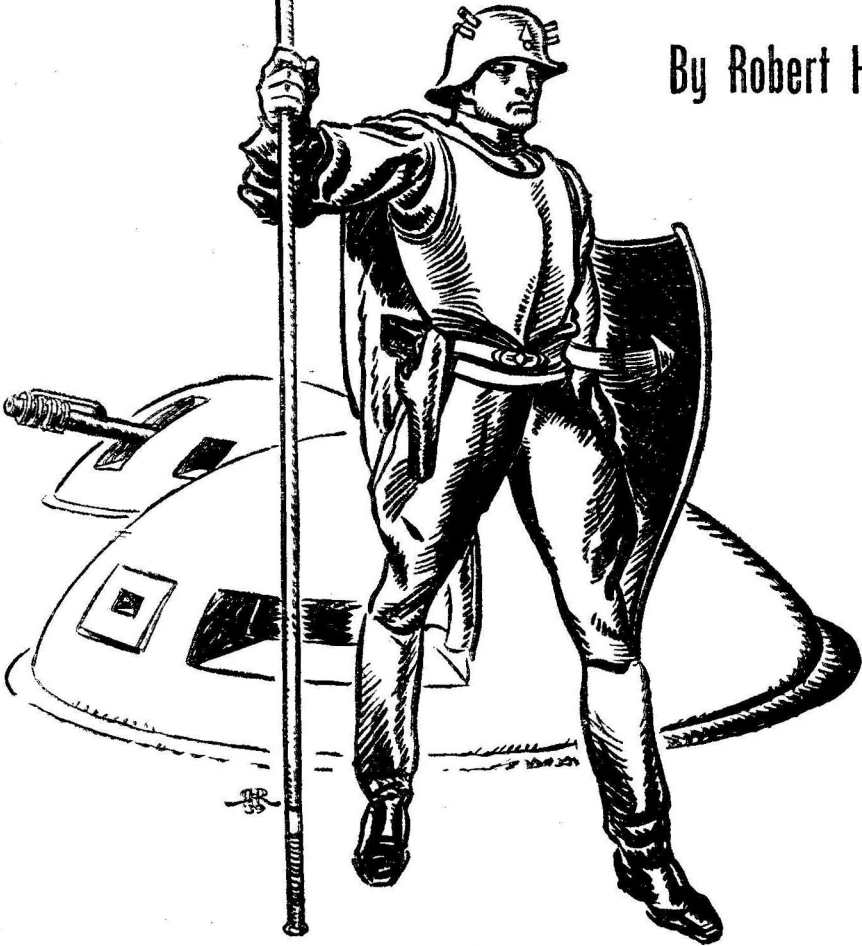
UNKNOWN

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IF THIS GOES ON

By Robert Heinlein



The second NOVA story Astounding has offered—a story so exceptional in its presentation, so powerful and logical, that it wins the rare NOVA designation!

A tale of Dictatorship in America—but dictatorship carried to its logical, deadly end! The ultimate of the "leader principle" is—The Prophet! Dictatorship hiding behind the mask of a false cult!

IF THIS GOES ON—

By Robert Heinlein

It was cold on the parapet. I slapped my numbed hands together, then desisted for fear of disturbing the Prophet. My heart was not at ease. I felt a vague unrest, not accounted for by the chill night air, nor by the long, fatiguing watch.

I was young then—a legate newly graduated from West Point, and a guardsman in the Angels of the Lord, the personal guard of the Prophet Incarnate.

At my birth my mother had consecrated me to the Church, and I was brought up to revere and venerate my spiritual elders. At eighteen my Uncle Absolom, a senior deacon, had used one of the appointments allotted to each member of the Council of Elders to send me to the military academy.

I was happy at West Point. The ideals of the service had seemed perfect and right. I hadn't minded the routine. On the contrary, I had rather enjoyed it—up at five, two hours of prayer and meditation, then classes and lectures in the manifold subjects of a military education, strategy and tactics, theology, mob psychology, basic miracles. In the afternoons we practiced with vortex guns and blasters, drilled with tanks, and hardened our bodies with exercise—the friendly monastic life of the barracks. I longed for it.

But now, in spite of prayer and fasting, I sometimes envied my brother, Lemuel, who enjoyed the casier discipline of the Rocket Patrol. He did not need to bother with the ritualistic spear and buckler, which

I must perforce wear constantly. I patted my vortex pistol. *That* was my defense should any of the ungodly seek to approach the revered person of the Prophet.

I heard footsteps approaching along the parapet, and I brought my pistol to the ready, thumb on the safety latch. But it was only the Tyler-of-the-Watch, making his rounds. His voice came to me.

"Watchman, what of the night?"

I answered mechanically, "Peace on Earth," and added, "It is cold, Elder Brother."

"Bitter cold, my Brother," he agreed, "even in the Temple." He passed on by, his pistol and bandolier of paralysis bombs slapping his armor with each step. I had hoped that he would stop for a few friendly words, but, doubtless, he was anxious to get back to the warmth of the guardroom.

I sighed and returned to my lonely vigil. I mused glumly on the difference between life here in New Jerusalem and life as I had envisioned it when I was a cadet. The Palace and Temple were shot through and through with intrigue and politics, I was forced to admit. Where now, was the proud and altruistic motto of the Service: "*Non Sibi, Sed Dei?*" I knew, too well, that the priests and deacons, ministers of state, and Palace functionaries all appeared engaged in a scramble for power and favor at the hand of the Prophet. Even the officers of my own corps, the Angels of the Lord, seemed corrupted by it.

Far down the inner corridor opposite me a light shone briefly. I glanced at the telechronometer strapped to my wrist. Yes, that would be the Virgins ministering to the Prophet.

A LITTLE FORM engulfed in a dark cloak slipped past me and stood at the parapet, staring at the stars.

I spoke: "Peace be unto you, my Sister."

She turned and answered me, "And to you, *little* Brother."

As she faced me I saw the Seal of Solomon on her forehead, the mark of the personal family of the Prophet. "Your pardon, Elder Sister. I did not see."

"I am not annoyed." She paused and seemed to invite conversation. I knew that it was not proper for us to engage in private conversation, for her mortal body was dedicated to the Prophet, even as her soul was the Lord's, but I was blue—and lonely.

"Do you attend the Holy One this night, Elder Sister?" I asked, to make an opening.

She nodded, and some vague fear seemed to haunt her eyes. "Yes, I serve tonight, my Brother, but I have as yet some ten minutes before I must be at the portal. I came out here to feel the peace of the stars."

"It must be a memorable privilege to serve him directly."

Again that veil of trouble and fear. "No doubt. I cannot say, for tonight is the first time my lot has been drawn."

I changed the subject, and inquired how long she had been in New Jerusalem, and whence she came. Only a few months, she told me, and she had been reared in upper New York State. There she was sealed to the Prophet at the Albany Seminary. I told her in turn, of my

origin in the Middle West, not a hundred miles from the Spring of Truth, where the First Prophet was incarnated.

Our talk became cheerful, even animated, and the haunted look left her eyes, leaving them dark and lovely. Her whole face held a wistful poignant beauty.

Her name, she told me, was Sister Judith.

My telechronometer, animated by the master clock at the Naval Observatory, tinkled its tiny chimes.

She gasped: "Oh, I must run," and was off before I could speak.

The watch wore on, while I dreamed thoughts of a peaceful domestic life, tucked away on a farm somewhere in the hills that rim the Mississippi Valley—blasphemous thoughts, for they included Sister Judith.

My own service was not forbidden to marry, though promotion was faster without it and the highest ranks always went to those who assumed the full priesthood possible only to bachelors. But her service forbade it, and well I knew it. So perhaps my thoughts were not too serious—certainly I did not believe myself to be in love with her on ten minutes' acquaintance—nevertheless, I indulged in the sin of longing for worldly comforts.

Sometime later, an hour perhaps, my reverie was broken by a commotion from within the Palace. I dashed down the inner corridor, and found a knot of women gathered around the portal. Two or three more were hurrying someone out the portal which led to the Prophet's inner apartments. As I approached, this figure collapsed and they eased it to the floor.

"What is the trouble?" I shouted, and drew my side arm clear.

An old woman intercepted me.

"It is nothing. Return to your post, Legate."

"I heard a scream."

"No concern of yours. One of the Sisters grew hysterical while attending the Holy Prophet."

"Who was it?"

"You are inquisitive. Sister Judith, if you must know."

My heart gave a convulsive bound. Judith!

"Let me help her!" My cry was involuntary. I started forward, but the old woman's implacable face barred my way.

"What nonsense is this! The Sisters will return her to her cell. Since when do the Angels of the Lord minister to nervous Virgins?"

She was right, of course. I made an unwilling retreat to my post.

As THE next few days wore past, I found it impossible to get Sister Judith out of my mind. Each night I watched for her to appear, even though I would not admit to myself that I was doing so. But she did not appear.

I shared an apartment in the bachelor officers' quarters with Zebadiah Jones, another Legate, three classes senior to me at West Point. I had been one of his plebes when he was a first classman. Now we were intimate friends, and he my only confidant. He noticed my preoccupation and taxed me with it. I was reluctant to talk, but his sympathetic attitude led me to unburden my soul. Much to my surprise, he was not shocked that I had allowed myself to become interested in one of the Virgins. So I told him the rest of my story; my doubts and troubles, the incident in the corridor, how I had hoped to see her again. He nodded sagely.

"I quite understand, old fellow. You would do well to keep your

thoughts to yourself, however. You haven't admitted this to anyone else, as yet?"

I answered with a negative.

"Then don't. I wouldn't even talk it over with our chaplain. He's a broad-minded old chap, but he might feel it necessary to relate it to his superiors. You wouldn't want to face the Inquisition, even if you are free of overt sin. In fact, especially in such a case, it is well to avoid the Question."

I shuddered at the thought—and I am not overly timid.

My mind chewed wearily over its black, uncertain thought. A question occurred to me. "Zeb," I asked, "what do you suppose got Sister Judith so upset when she attended the Prophet?"

"Huh? I don't know. She takes her religion pretty seriously, doesn't she? Sets a lot of store by it?"

I assured him rather stiffly, that Judith was truly devout, devout as any mother would want her daughter to be.

He gave me a slow grin. "I keep forgetting that you are one of God's Innocents, yourself. A girl as religious and as untouched by the world as you describe Judith to be, might find a lot of things about the Holy One to shock her. A man doesn't get to be political boss of a country as big as this just by doing good deeds, thinking holy thoughts, and saying his prayers." He stopped suddenly. "What was that?"

We had been strolling on the broad terrace surmounting the south turret, in order to be free of the surveillance of the eye and ear concealed in every room of the quarters. I had heard the shouting to which Zebadiah referred. We moved to the edge and looked down. A crowd of fifty or sixty persons was charging raggedly up the slope that led to the

Palace walls, and ahead of them, fleeing from them, ran a man with head averted, dressed in a long gabardine. He was headed for the Sanctuary gate.

Zebadiah glanced down and answered himself. "So that's all the racket is. Just some of the rabble stoning a pariah. Probably some fool careless enough to be caught outside the ghetto after five o'clock. I don't think he'll make it, do you?"

His prediction was immediately realized. A large rock caught the figure between the shoulder blades, he stumbled and went down. They were upon him at once. He struggled to his knees, was struck by a dozen stones at once, and went down in a heap. He gave a broken, high-pitched wail, then drew a fold of the garbardine across his dark eyes and strong Roman nose.

A moment later there was nothing to be seen but a pile of rocks, and one protruding slipped foot. It jerked and was still.

I turned away, nauseated. Zebadiah caught my expression.

"Why," I said defensively, "do these pariahs persist in their heresy? They seem such harmless fellows, otherwise."

Zebadiah cocked a brow at me. "Perhaps it's not heresy to them. Didn't you see that fellow resign himself to his God?"

"But that is not the true God."

"He must have thought otherwise."

"But they all know better; we've told them so, often enough."

He did not answer, but smiled at me in an irritating manner. I persisted. "Don't you think it is *right* to stone the ungodly?"

He changed the subject abruptly. "Did you notice who threw that first stone?" I hadn't, and told him so; all I remembered was that it was a

man dressed in country clothes, rather than one of the women or children.

He told me. "It was Snotty Weems." His lip curled.

I remembered Weems well enough. He was two classes senior to me at the Point, and had made my plebe year something better forgotten.

"So that's how it was," I answered. "Hm-m-m—I don't think I could stomach the Secret Service."

"Not as an *Agent Provocateur*, at least," he agreed. "Still, I suppose the Council needs these incidents occasionally. These rumors about the Cabal, and all—"

I caught at this last remark. "Zeb, do you really think there is anything to this Cabal? I can't believe that there is any organized disloyalty to the Prophet."

He pursed his lips. "Well—there certainly has been some trouble out on the West coast. Oh, forget it; our job is to keep the watch here."

II.

BUT we were not allowed to forget it. Two days later the outer guard was doubled. I was delighted to find that Zebadiah had been assigned to the same night watch and post as myself. The long hours of the night were much less tedious with someone to share them—for me, at least. As for Zebadiah, I wearied him with endless talk of Judith, and of how unhappy I was with things as I found them in New Jerusalem.

One night he checked my interminable complaints. "John," he said, "do you love this Sister?"

I demurred. I had not admitted even to myself, that I felt anything more than concern for her welfare. He cut me short.

"You do, or you don't. Make up your mind. If you do, perhaps I

can help. If you don't, shut up about her."

I did not pause to ponder long. I took a deep breath and answered, "I believe I love her, Zebadiah. It seems a strange thing, an impossible thing, and most surely a sinful thing, but there it is."

"Aye, all of that, and folly to boot. But I can see there's no use to talk prudence to you. I can probably get a message through to her, if you wish."

I caught his arm. "Would you, Zeb?"

"I said so. But don't forget; it's court-martial at least—and possibly the Question."

"I'll chance even that."

"Very well, then; what is the message?"

I thought for a moment. It would have to be something short. "Tell her that the Legate she talked to the night her lot was drawn is worried about her."

"Anything else?"

"Yes—tell her that I am hers to command!"

AT LUNCHEON the next day I found a scrap of paper folded into my napkin. I hurriedly finished my meal, and slipped out to read it.

I need your help and am grateful for it. Will you meet me tonight?

It was unsigned, and written in characterless uniform script of the common lectroriter.

When Zebadiah returned to our apartment, I showed it to him. He glanced at it, and remarked in an idle tone of voice:

"Let's take a walk. I feel stuffy after so much food."

When we reached the open terrace, and were out of earshot, he cursed me in low, dispassionate tones. "You'll never make a conspirator.

Half the mess may know that you received something in your napkin. Why in God's name did you bolt through your meal and rush away like that? Then to top it off, you hand me the note in our apartment. For all you know, the eye read it over your shoulder, and electrostate it for evidence."

I protested my innocence. He continued: "Never mind. I know that you didn't *intend* to put us both in jeopardy. But remember this. The first principle of successful intrigue is never to be seen doing any thing unusual, no matter how harmless it may seem. You should have remained in the mess hall the usual time, chatted the usual time there after, neither more nor less, and awaited an opportunity to read it. What have you done with it?"

"I tucked it in the pocket of my corselet. Don't worry; I'll swallow it."

"Not so fast. Wait here." He left me and returned a few minutes later. "I have a piece of paper in my hand of the same size and shape. I'll pass it to you quietly. Find some pretext to reach for your pocket, and exchange the two slips of paper. Then, and not until then, is it safe to destroy the note."

I complied, but asked for an explanation.

"Don't you see? If the eye saw you receive the note, or saw you read it, but failed to read it itself, you will be searched. They must find what they seek."

"What is on the second sheet of paper?"

"Some notes for gaming at dice."

"But that's forbidden, too!"

"Of course. If they think that they have uncovered evidence of gambling, they will *not* think it is evidence of a much more serious sin. At the worst, you will get a wiggling

and a small fine. Remember this, John; if you are ever suspected of anything, always try to make the evidence prove guilt of some minor offense. Never try to prove lily-white innocence. Human nature being what it is, your chances are better the other way."

Sure enough, the contents of my pockets must have been photographed almost as quickly as I changed uniforms. The Executive Officer of the Guard called me into his office not thirty minutes later, and asked me to keep my eyes open for evidence of gambling among the junior officers. It was a sin, he said, that he hated to have his younger officers fall into. He clapped me on the shoulder as I was leaving. "You're a good boy, John Lyle. A word to the wise, eh?"

HALF THE watch passed with no sign of Judith. I felt as uneasy as a cat in a strange house. Zebadiah kept me strictly to commonplace routine. At long last, there came the sound of soft footfalls from the inner corridor, and a shape appeared at the doorway. Zebadiah stepped in front of me, and motioned me to remain at my post. He returned almost at once and signaled for me to enter, with a finger at his lips. I entered and my eyes searched out the figure in the gloom. It was not Judith, but some woman strange to me. I started to speak, but Zebadiah's big hand covered my mouth.

The woman took me by the arm and urged me down the corridor. I glanced back and saw Zebadiah silhouetted in the doorway, alert. My guide paused and pushed me into a tiny alcove, then she drew from some recess in her clothing, a small instrument which glowed with a dim violet radiance. She passed this

rapidly over the walls, snapped it off, and returned it to her person.

"You may speak now," she said, "but not too loudly. There is neither eye nor ear concealed in this place." She slipped away.

I felt a gentle touch at my sleeve. "Judith?" I whispered.

"Yes. Yes—" she breathed, and the gentle pressure increased.

Then my arms were around her, and my lips found hers. She gave a little, startled cry, then relaxed in my arms, and responded with endearing clumsiness.

It is of no importance to anyone else what we talked about for the next few minutes. Suffice that the magic which I had felt those ten minutes on the parapet a long, long week ago, had touched her, too. Aye, and changed her.

Presently, I asked her about the matter that had been worrying me. "Judith," I said, "what happened while you were attending the Prophet? What was the trouble?"

I could feel her shaking. "John—John, it was horrible!"

"What was?"

She pulled herself together. "I had expected to see someone saintly—almost divine. But he wasn't like that at all. He was just a cynical, sneering old man. I went in and took my post as doorkeeper, as I had been instructed. He was talking with another man, one of the deacons. The things they talked about shocked me. He made a remark—oh, a terrible, worldly thing—and they both laughed.

"Then he noticed my face, and scowled at me. 'What's troubling you, my girl?' he said. At first I couldn't answer, then I quoted scripture to him. He seemed astounded, then angry, and called for the Senior Sister, and told her, 'Take this stupid wench out of here, and see that she

is better trained.' Then they took me away."

I comforted her as best I could. She went on:

"But that wasn't the worst. The Senior Sister questioned me the next day, and we had—well—an argument. As a result of that, the Prophet sent for me, and gave me a tongue-lashing. I really mean it. He told me that it was not my business to think, my duty was to obey and to believe, and that if I had any doubts as to his divine authority, to forget them. But he *made* me have doubts. Oh, John, what am I to do? I'm afraid!"

"We will do something—somehow."

"But what *are* we to do, John? I must leave this place—escape from New Jerusalem! My lot may be drawn any night. I couldn't bear to attend him again. I'd . . . I'd say something rash, and get the Inquisition! I think already they begin to suspect me of dealings with the . . . the Cabal!"

I did not know how to answer her. Escape was difficult at best, and even if she escaped, where could she go? No citizen of the United States would dare give shelter to an unveiled Sister. She would be almost certain of arrest, probably within twenty-four hours. Nevertheless, she could not remain here. To have her in danger was intolerable.

"You must escape. We will find a way."

WE DISCUSSED the possibilities. Canada was a bare three hundred miles away, but the border was closely guarded, and extradition too likely. Mexico was safer, but it was distant, and she would be stranded in a strange land without money, and no knowledge of the Spanish tongue. But we eventually settled

on Mexico. There still remained the problem of how to do it. I told her that I would talk it over with Zebadiah, and that he was bound to have some feasible plan. I was not so sure of it, myself; it is one thing to assist at a Palace intrigue, quite another to be an accessory in anything as treasonable as our plan.

Judith had a suggestion. "You know the Sister who guided you here. No? That is Sister Magdalene. I am sure it would be safe to tell her, and she *might* be willing to help us. She's very clever."

I agreed, and started to comment, when she stopped me.

"But John, dearest, what will you do?"

"Me? I hadn't thought of that. I shall have to stay here."

"And not see each other again? I won't go."

"But you must go. The Prophet will—"

"Better that, than to go without you, now that I have found you."

"But Judith, darling, listen to reason. You *must* go."

"Not without you."

We were interrupted by Sister Magdalene. "Quick," she snapped, "your companion signals you."

I dashed out to the parapet, and was just in time to face the Tyler. He exchanged challenges with us, and then the ubiquitous old fool wanted to chat! He settled himself down on the coaming and commenced maundering of inconsequentials, picking his teeth the while. I wished heartily that the night had been as cold as a week ago, even as I made conversation in the fashion normal to a man bored by a night watch.

At last he got to his feet. "As I was saying," he babbled, "I may be past forty, and getting a little slow on my feet, but I've still a fast eye

with the blade, aye, and with the bayonet, too." He was boasting of a picayune fencing victory of the past week end. He walked over toward the Palace door. "Perhaps I had better take a turn through the Palace," he added, "we can't take too many precautions these days. They do say the Cabal has been active again." He took out his torchlight and flashed it down the corridor.

I froze solid. If he went down that corridor, it was beyond hope that he could miss two women crouching in an alcove.

But Zebadiah was on the alert. "Stay a moment, Elder Brother. Will you show me that timed riposte with which you won that last bout? It was too fast for the eye to follow."

He rose at once to the lure. "Glad to, son," he replied in flattered, self-important tones, "Draw your blade. *En garde!* Cross blades in line of sixte. Disengage and attack me. There! Hold the lunge and I will do it slowly. As your point approaches my chest" (Chest! The old fool was as potbellied as a kangaroo!) I engage it with the forte of my own in line of quarte and force my point over your blade in riposte seconde. But I do not complete the riposte! Strong as it is, you might parry it. Instead, I beat your blade out of line, and attack where I will, always in a different place. Come now, try it!"

ZEBADIAH followed the directions with care, though clumsily at first. They tried it again, and again. At the conclusion of each phrase, the Tyler retreated a step in order to avoid the unbated point of Zebadiah's sword. In spite of my fear and preoccupation, I watched it, for it was an artistic demonstration of a

once useful military art. Zebadiah learned the phrase rapidly, but insisted on repeating it to perfection. Five minutes later they ceased, some fifty yards from the corridor door and that much nearer to the guard-room. I could hear the Tyler puffing from the repeated lunge-and-retreat.

"That was fine, Jones"—*puff*—"you caught on handsomely"—*puff*—"I think I will let you inspect the corridor"—*puff*—"you've given me a proper workout"—*puff*—"lucky for me that a true bout does not need to go on so long"—*puff*—"God keep you."

"God go with you, sir," replied Zebadiah, bringing his blade up to salute.

As soon as he was clear, I hurried back to the alcove. The women were still there, huddled far back against the wall. "He's gone," I reassured them. "Nothing to fear for a while."

Judith had told Sister Magdalene of our dilemma, and the three of us discussed it in hurried whispers. Sister Magdalene advised caution, and said she could frame the drawing of the lots to protect Judith for a fortnight, at least. "That will give you time to make plans." She paused, and listened. "Quiet—"

She faded silently out of the circle. Then a thin pencil of light flashed out and revealed a figure crouching on the floor outside the alcove. I dived and was on him before he could get to his feet. Fast as I was, Sister Magdalene was as quick. She landed on his shoulders as he went down. He jerked and was still.

Zebadiah came running in, and checked himself at our sides. "John! Maggie!" It was a tense whisper. "What is it?"

I answered. "We've caught a spy, I think."

Zebadiah flashed his light. "You've knocked him out."

"He won't come to," came Magdalene's voice out of the darkness, "I slipped a vibroblade between his ribs."

"Holy Spirit!"

"There was no other way. Be glad I didn't use steel, and spill blood for them to track us by— What do we do now?"

"Let's see who it is. Turn him over, John." I did so, and the light flashed again. "Look, John—it's Weems. Well, he's no loss to anyone. Now what to do with him?" He stopped for a moment. You could almost hear him thinking. "John!"

"Aye."

"Keep the watch on the parapet. If anyone comes, I'm inspecting the corridor. This clay must go in the incinerator."

Judith broke her silence. "I'll help you. There's a refuse chute on the floor above." There was a girl!

They were back in less than five minutes, though it seemed longer to me. By the time they returned, old Snotty's body had no doubt been reduced to its primordial atoms in the fierce disintegration blast. I breathed easier at the sight of them.

Zebadiah was curt. "The watch will be relieved in ten minutes. This tears it. We've got to hold a quick council of war and think our way out of this."

We all offered suggestions, most of them impractical to the point of ridiculousness—all but Zebadiah. Then he spoke straight to the point.

"We all agree that something must be done, or we'll never be able to help Judith. And worse than that, we all stand in mortal danger of the Question."

"Aye."

"Yet none of us has a plan?"

"That's true."

"There's just one answer—there's nothing else for it—the Cabal!"

III.

"THE Cabal?" I repeated stupidly. Judith gave a horrified shudder.

"Why . . . why, that would mean our immortal souls! They worship Satan!"

He turned to her. "I don't believe they do."

She gazed at him. "Are *you* a Cabalist?"

"No."

"Then how do you know?"

"And how then," I added, "can you lead us to them?"

It was Magdalene who answered. "I am a member—as Zebadiah knows."

Judith shrank back from her, but Magdalene pressed on, directing her words to Judith. "I understand your feelings, Judith. I was once as horrified at the idea of anyone opposing the Church as you are. Then I was called on to serve the Prophet, and found what a lying sham it was." She put her arm about the younger girl's shoulders. "We aren't devil-worshippers, my dear, nor do we fight the True Religion. Rather, in the face of persecution, we have kept alive the flame. Trust us, my dear. You know what this self-styled Prophet really is. How can the cult he heads be the true Church? If you come with us, we will do everything in our power to aid you. Otherwise, we dare not risk it."

Judith searched her face in the faint light from the doorway. "You swear that this is true? The Cabal does not war against the Lord Himself, but only against the Prophet?"

"I swear it, Judith."

Judith took a deep breath, then let it out with a sigh. "God guide me,"

she said, "I cast my lot with the Cabal."

Magdalene bent down and kissed her, then quickly faced us men. "Well?"

I answered at once, "I stand with Judith," then whispered to myself, "Dear Lord, forgive me my oath. I must do this thing!"

Magdalene was staring at Zebadiah. He shifted uneasily, and spat upon the tiles. "Did I not propose it? But we are all damned fools and will burn for this night's work."

THERE WAS NO further chance for talk until the next day. I woke from troubled dreams, and eyed without favor, my breakfast tray. From the next room I heard the buzz of Zebadiah's shaver, and the merry sound of whistling. He entered my room and pulled the covers from me, all the while spouting a running stream of persiflage. "Up you come, son! God's sunshine is wasting. It's a beautiful day, and the snail's on the thorn!" He grasped my wrist and pulled me toward him.

His grip seemed nervous. His forefinger twitched against my skin. I thought for a moment that his nerve was cracking under the strain of the pretense, then I noticed that the twitching was curiously regular. He was signaling to me in code!

"B-E — N-A-T-U-R-A-L — S-H-O-W—N-O—S-U-R-P-R-I-S-E —W-E—W-I-L-L—B-E—C-A-L-L-E-D — F-O-R — E-X-A-M-I-N-A-T-I-O-N—D-U-R-I-N-G—T-H-E—R-E-C-R-E-A-T-I-O-N—P-E-R-I-O-D—T-H-I-S—A-F-T-E-R-N-O-O-N—"

Through it all, he kept up the flow of inconsequential badinage.

I showed—I hope—no surprise. I got up and went about the normal

AST—2

stodgy tasks of preparing for a new day. Presently, I found an excuse to lay my hand on Zeb's shoulder, and squeezed out dots and dashes in answer: "O-K—I—U-N-D-E-R-S-T-A-N-D—"

The day was a misery of nervous monotony. I made a mistake during formal guard mount, a thing I haven't done since I was a plebe. When the working day was finally over, I returned to our quarters and found Zeb lounging with his feet on the air conditioner, trying to work an acrostic in the *New York Times*. His corselet was unbuckled, his hair mussed. He quite evidently had not a care in the world. As I came in, he looked up and greeted me, "Hie, son, what's a six-letter word meaning 'pure in heart'?"

"You'll never need to know," I answered, sitting down and commencing wearily to remove my armor. His eyebrows shot up in mock surprise.

"Why, John, don't you think I shall reach the Heavenly City?"

"Possibly—after ten thousand eons in Limbo."

I heard a knock at the door, then it was shoved open, and I saw the face of Timothy Klyce, senior legate of the other watch, and brevet captain. He addressed us in nasal Cape Cod speech, "Hello, you chaps, want to take a walk?"

This was very bad luck, I thought, Tim was a hard man to get rid of, and the most punctiliously devout in the corps.

I was trying to think of an excuse, when Zeb spoke up. "Don't mind if we do. Could we stop by town? I've some shopping to do."

I was disconcerted by this turn of events, and tried to object, maintaining that I had some paper work to complete, but Zeb cut me short. "Oh, come on. I'll give you a hand

on it tonight. The fresh air will do you good."

We went out by the lower tunnels. I walked along silently, wondering what we could do to shake our unwelcome companion. We had just entered a little jog in the passageway, when Timothy raised his hand in a gesture to emphasize some point in his conversation with Zeb. His hand passed near my face and I felt a soft insufflation across my eyes, the merest breath of air, and suddenly I was blind.

BEFORE I had time to cry out—even as I repressed the reflex to do so—I was grasped firmly by my upper arm. Timothy continued his sentence without a pause. The grip on my arm guided me to the left, whereas, my memory of the passage led me to believe that the turn should have been to the right. After a few moments the blindness gradually wore off. Apparently we were still walking along the tunnel, with Timothy in the middle, grasping each of us by the arm. We stopped in front of a door—a door that shouldn't have been there. Timothy knocked once, then appeared to listen.

No voice spoke that I could hear, but he answered: "Two pilgrims, duly guided."

After a short wait, the door opened. We entered, it closed silently behind us, and there, facing us, was a masked and armored guard, with blaster drawn. Reading behind him he rapped once on an inner door. Immediately there issued from it, another figure similarly armored and masked, who approached us and asked us separately: "Do you seriously declare, upon your honor, that, unbiased by friends, and uninfluenced by mercenary motives, you

freely and vountarily offer yourself to the service of this order?"

We each answered, "I do."

Our interrogator turned to the other, "Hoodwink and prepare them."

Leather helmets were placed over our heads, which covered them completely, save only the mouth and nose. Then we were ordered to strip off our clothes. I felt a sharp prick of a hypodermic in my forearm. From there on, my recollection is vague. Something cold was pressed against my ribs on the left side in back, and I realized, dimly, that it was the hilt of a vibroblade that needed only a thumb on the stud-switch to sound taps for me, but I felt no alarm. There were questions, many questions, to which I responded automatically, unable to deceive, even had I the wish. I remember them in snatches:

"—of your own free will and accord—" "—conform to the ancient established usages—" "—a man, free born, of good repute, and well recommended."

Then, for a long time I stood shivering on the cold tile floor, while some spirited discussion took place around me. It had to do with my motives in seeking admission. I could hear each word and knew that my fate hung in balance, that a word would cause to spring out from the cold hilt pressed into my back a blade of cold energy, thereby settling the argument and me with it. And I realized that the discussion was going against me.

Then a contralto voice was lifted over the others, vibrant, dominating. It was the voice of Sister Magdalene. In my drugged condition, I welcomed it simply as a familiar sound, with no thought of her possible effect on my fate.

But the pressure of the hilt re-

laxed; I felt the prick of a hypodermic-again. When I came to myself, a strong baritone voice was intoning a prayer:

“Vouchsafe Thine aid, Almighty Father of the Universe—love, relief, and truth to the honor of Thy holy name. Amen.”

And the answering chorus, “So mote it be!”

Then I was conducted around the room, while questions were put to me from time to time. These questions were symbolic in nature, and were answered for me by my guide. Then my progress was checked, and I was asked if I were willing to take a solemn oath pertaining to this degree, and was assured that it would in no material way interfere with duty that I owed to God, myself, family, country, or neighbor.

I answered, “I am.”

I was then required to kneel on my left knee, with my left hand supporting the Book, my right hand steadying certain instruments thereon.

The oath and charge was one to chill the blood of anyone foolish enough to take it under false pretenses. Then I was asked what, in my present condition, I most desired. I replied, as I had been coached to do: “Light!”

And the hoodwink was stripped from my head.

IT IS NOT necessary, nor desirable, that I record here the rest of my instruction as a newly-entered brother. Suffice to say that the instruction was long, and of solemn beauty, and there was nowhere in it any trace of the macabre and blasphemous devil-worship that common gossip alleged. It was filled with reverence for God, brotherly love, and uprightness, and included instruction in the principles of an ancient and honorable profes-

sion and the symbolic meanings of the working tools of that profession.

But I must tell you of my surprise at the instant the hoodwink was taken from my eyes. Standing before me, vested in the symbols of his office, and wearing an expression of almost inhuman dignity, was the fat, ubiquitous Tyler of my watch, *Master* of this lodge!

The ritual was long, and the time was short. When the lodge was formally closed, we gathered in an informal council of war. I was informed that the senior brethren had already decided not to admit Judith to the order at this time, as she was to be spirited away to Mexico, and it seemed safer not to extend unnecessarily the circle of those who knew the local secrets of the Cabal. Zebadiah and I, being of the Palace guard, could be of real service to the Cabal, and were consequently admitted to membership.

Judith had been given hypnotic instructions which, it was hoped, would prevent her from revealing what little she knew, if she should be exposed to the Question. I was told to wait and not to worry; that the senior brethren would take the steps to remove Judith from danger. With that I was forced to be satisfied.

For three successive days Zebadiah and I reported during the recreation hour, for instruction, each time using a different route and a different means to escape detection. It became evident, that the architect who designed the Palace had been one of us, for many were the undetectable peculiarities of that ponderous pile of masonry. At the end of the third day we were fully accredited senior brethren, qualified with a speed possible only in time of crisis.

On the fourth day we entered the

lodge room, using the signs and passwords appropriate to our new rank, to find the lodge not in session. Instead, some three or four of the brethren were gathered around Magdalene who was consulting in hurried

tones with the lodge Master. They ceased talking as we came in.

Zebadiah ran his eye over the group, and demanded, "What's up, Maggie?"

She looked at me, and hesitated



Illustrated by Hubert Rogers

Someone loosened the hoodwink, and I opened my eyes to see two grim, armed warriors of the Cabal covering me—

before replying. "Judith has been arrested."

I thought that my bodily functions would stop, and that I would give up the ghost then and there. I am not an unusually cowardly man, and a truly craven character cannot last through West Point, but there is something about danger to a loved one that freezes the blood of the bravest.

"The Inquisition?" I faltered.

"I am afraid so," she admitted. "They took her away early this morning, and she has been held incommunicado for some eight hours."

"Has any charge been filed?" asked Zeb.

"No."

"Hm-m-m—that looks bad."

"But what can we do?" I expostulated.

Magdalene's eyes showed her pity. "There is nothing you can do. You couldn't get within five guarded doors of her. As for the rest of us, well—"

The lodge Master finished the sentence. "There is little that the rest of us can do. Magdalene is the only one of us who has access to the inner Palace. It is in her hands."

I turned to her, and questioned silently.

She sighed, and said, "I'll go, but there is probably little that I can do." With that she left.

AND we waited. And waited. And waited. It is difficult for any of you who have not lived in the shadow of the Inquisition to appreciate the awe and dread in which we held it then. We knew no details about it, but we sometimes saw the unlucky ones who had faced it—when they lived. But rarely were they able to give any coherent account of what they had undergone. Even if the Inquisitors did not re-

quire the Auto da Fé, the mind of the accused was usually weakened, even shattered, by the experience.

The lodge Master perceived my agitation, and directed the Junior Warden to examine me as to my progress in memorizing the mysteries intrusted to me during the three days past. Much against my will, I repeated after him the words of the rituals. He forced me with relentless kindness to concentrate on the intricate rhetoric.

Somehow, nearly three hours passed. At last came three raps at the door and the Tyler-of-the-Lodge admitted Magdalene. I sprang up from my chair, and rushed to her.

"Well?" I cried. "Well?"

"Peace, John," she answered, "I have seen her."

"How is she? Is she all right?"

"Better than you have any right to expect," she told me. "Her mind is still there. As for her body, it's young and healthy. Barring a scar or two, she should recover completely."

I started to ask another question, but the Master cut in.

"I gather from your words, Sister Magdalene, that they had already put the Question to her. How, then, did you manage to see her?"

"As to that, Peter," she responded, addressing the lodge Master by his given name, "the Chief Inquisitor is an old acquaintance of mine. I sent a message in to him, then begged a respite for the girl."

"He agreed to that?" The Master was plainly surprised. For that matter, so was I.

"Oh, that? There was something he wanted me to do; I agreed to do it, in exchange for this favor."

She went on, "Apparently, Judith fainted rather early in the proceedings. She may not have had time to be questioned about any of us. On

the other hand, the Inquisitors are sly—they may be playing with us. What do you think, Worshipful Master?"

Peter pondered it. "You say she has only a reprieve?"

"For twenty-four hours—to gain strength to be questioned again."

"Do you think they suspect her of association with the Cabal?"

"Frankly, I do. I think it is both that, and she has been chosen as an object lesson to other Virgins—to teach us not to object to the requirements of our service."

"We cannot," the Master decided, "chance it. She must go tonight. Senior Warden, attend me! The rest of you, leave! Your instructions will reach you."

DINNER THAT night was a trial. After the Chaplain had intoned his lengthy blessing I did my best to join in the noisy chatter while eating mechanically food that threatened not to stay down. Seated next to me was a dour classmate of mine, Grace-Of-God Bearpaw, half Cherokee Indian, half Scotch. He and I had little in common and rarely talked. Tonight he was as taciturn as ever. In the course of the meal he placed his foot so that it rested partially on mine. I impatiently moved my foot out of the way. But his foot found mine again, and pressed against it. Slowly and clumsily the pressure increased and abated, spelling out words in dots and dashes:

"—hold steady you fool," he spelled out, "you have been chosen—it will take place on your watch—you will receive the details then—eat and start talking—take a large strip of adhesive tape on watch with you—six inches by a foot—repeat message back—"

I managed, somehow, to eat while

tapping out my reply. Truly, the Cabal had long arms.

IV.

WE RELIEVED the watch at midnight. As soon as the marching footsteps receded into the night, I told Zebadiah of the partial instructions I had received. I inquired of him whether or not he had been given any to pass on to me. He had not; there was nothing for it but to wait, while wondering whether or not something had gone wrong.

About an hour had passed when I heard a hiss from the doorway leading to the inner corridor. I approached cautiously and made out a female form. It was too short to be Magdalene. I never knew who she was, for she shoved a piece of paper in my hand and fled.

I consulted Zeb. "What shall I do; read it with my flash? That seems risky."

"Open it up, first," he counseled. I did so, and found that it was covered with fine script which glowed with a faint radiance. It was possible to read it, yet no spying eye could possibly detect me doing so. The message was terse, but specific:

At the middle of the watch on the stroke of the hour you will leave your post, and enter the Palace by the door where you received this note. Forty paces from the door, take the stair on your left, climb two flights, proceed to the north fifty paces. There you will find a guard at the doorway on the right, which leads to the Virgins' quarters. He will not resist you, but you must use a paralysis bomb on him, fourth intensity, in order to provide him with an alibi. At the far end of the central corridor, there is the cell you seek. There will be a light burning over it, and a female guard. You must completely disable her, but you are forbidden to kill her. Use the adhesive tape as a gag and

blindfold. Take her keys, enter the cell, and carry away Sister Judith. She will be unconscious. Bring her to your post, and hand her to the Tyler-of-the-Watch.

You must make haste from the time you paralyze the portal guard, as an eye may see you pass the lighted doorway, and the alarm may sound before you have completed.

Do not swallow this note; the radiant ink is poisonous. Drop it in the incinerator chute at the head of the stairs.

Go with God.

At the two muted strokes of the middle watch, I leaned my spear against the wall, unbuckled my sword, and placed it by the spear. Zeb thrust a gauntleted hand in mine and squeezed until I winced. Then I was away. Two—four—six—forty paces. I groped along the left wall, found the opening, and felt around with my foot. Ah! There were the steps. One flight, two flights—I almost fell headlong when I stepped on a “top” step that wasn’t there. I steadied myself. Where was that refuse dump? It should be at floor level and the instructions said “head of stairs.” I couldn’t find it. I felt around frantically, then debated whether to show a light, or take a chance on keeping it. Then my hand found the latch; with a sigh of relief, I tossed away the evidence that would have incriminated so many others. Then I was beset by doubts. Was that the incinerator chute? Could it have been a delivery panel, instead? I open the panel again, and listened. Was that the crackle of the disintegrator? I thrust one arm far in, and drew it back hastily, almost blistered through my gauntlet. I resolved to have no more doubts, but to trust my instructions.

Forty paces to the north the passage made a jog. That was not in the instructions. I paused, crept slowly

forward, and peered around the turn. There stood the guard. I had been assured that he would not resist, but I took no chances. I slipped a bomb from my belt, set it by touch to fourth degree, pulled the primer, and counted slowly to five to allow for the point-blank range.

It burst with a little tinkly *pop*, and I ducked back out of range of the rays. A few seconds later I reconnoitered. The guard was slumped down in a heap, his forehead bleeding slightly where it had struck on a fragment of the bomb case. I stepped over him, quick march, and slid down the central hall of the Virgins’ quarters. Almost at once, I saw the end of my search. But I stopped, nonplused, for the female guard, instead of walking a post, was seated with her back to the cell door. There was no doubt in my mind that I could overpower her, but considerable doubt as to whether I could do so before she could scream for help.

BUT I had no time for elaborate plans. Even now the eye might have noticed the condition of the portal guard. I removed my right gauntlet, and placed the adhesive tape across my palm, sticky side out. Then with my left hand I threw my right gauntlet so that it arched over the woman’s head, and struck the floor beyond her.

When it struck she turned her head and I leaped. My dive carried us both to the floor, but my hand was across her face, and she was gagged. I tapped her lightly across the base of the brain with the edge of my palm. She went limp.

I searched her for the keys. Then I was in the cell, and my beloved was in my arms!

Her face was white and her heart beat softly. She did not stir when

I picked her up. Her gown slipped and I saw some of what had been done to her. I vowed a solemn vow to pay it back in kind, sevenfold, if flesh could live that long.

I had no time to be gentle, but swung her into the rescue carry, over my right shoulder, my right arm between her knees, right hand grasping her right wrist. Then I swung away at a dogtrot.

The guard still lay where I had left him. I thought I had won clear, and was just stepping over him when I heard a gasp from the side corridor on my left. Why are women restless at night? If this female had not risen in the middle of the night, I might have never been seen at all.

I ran my best, burdened as I was. The sheltering darkness was welcome, but there was no telling how long it would remain dark. Whoever it was that had seen me was morally certain to give the alarm. Unless I was clear of the Palace before the lights went on we were almost certain to be apprehended. I lost precious seconds locating the stairway—I overran it in the blackness, and had to retrace my steps, and feel around for the opening with my free hand.

At last I found it, none too soon, for I thought I could make out sounds of people stirring about and shouting somewhere behind me. Down two flights, a headlong run toward the parapet, and I was out under the stars with my precious load—just as the corridor lights flashed on behind me! Almost simultaneously, the general alarm gongs went off altogether, with a deafening dissonant jangle.

But Peter, the Tyler-of-the-Watch, was waiting at the door. He grabbed Judith from my arms without a word, and set off up the parapet toward the guardroom. She was

almost as big as he was, and I knew him to be short of wind; despite these handicaps, he made good time, running with short, waddling steps, his fat belly jouncing.

I stood staring after them, my wits elsewhere, when Zebadiah recalled me to the present by shoving my spear into my hand, and starting to buckle on my sword belt.

“Look alive, man!” he hissed; “that general alarm means us. You’re supposed to be on guard duty, you know!”

I finished strapping on my sword, and drew and cocked my pistol. Then we stood back to back, superficially correct in our alertness; for unless the disturbance took place within the limits of our post, we were forbidden to leave it for any reason whatsoever, unless directed to do so by competent authority.

For some minutes we waited. We could hear the sounds of running feet and challenges. The Officer-of-the-Watch ran past us into the Palace, fastening his corselet over his night clothes as he ran. I almost blasted him out of existence before he answered my challenge. Then the Relief Watch Section swung by in column of twos at double-time, the Relief Tyler at their head.

Gradually the excitement died away. One hour after I had left my post to rescue Judith, the Relief Watch Section came tramping back. Instead of passing on by, they halted, and our two reliefs fell out of ranks. We turned over our post to them and fell in with the section.

V.

WE WERE MARCHED into the guardroom, formed into platoon front and left standing at attention. Then we waited—and waited—and waited. The guardroom chronometer chimed

the third hour of the watch.

The Officer-of-the-Watch strolled around the room, and looked us over. One man in the rear shifted his weight. His accouterments clattered a trifle. It was a deviation from military precision that would have gone unnoticed at dress parade, but tonight his reprimand was swift and sharp. The tension increased.

It was evident that they intended to make us tired and nervous before questioning us. I thought of Zeb-adiah's warning concerning how to engage successfully in deception, and resolved not to let them shake my nerve. How would I feel, and how would I act, if I were totally innocent and ignorant of the night's affairs? Interested and stimulated at first, probably. Curious as to the cause of the alarm. Then what?

I tried to imagine what my feelings would have been at the interminable ordeal of remaining at attention. Apprehension? A little, perhaps, but I had been so smugly virtuous in the past that it would not have occurred to me to fear seriously for my own skin. Outraged virtue was more nearly in character. Yes, and a feeling of resentment at being made to stand at attention like any plebe being hazed by upper classmen.

That was the line to take! I concentrated on the idea until I had actually induced the appropriate emotions.

By the time the Commander of the Guard had arrived, I was white-lipped with anger. I did not like him much, anyway. He was a short, officious little man, with a cold eye and a supercilious manner. Now he stood before us, his priest's robes thrown back from his shoulders, his thumbs caught in his sword belt. He jutted his stiff spade beard at us and scowled.

"Well?"

No one answered him.

"Speak up! Some one of you knows something about this. Answer up—or would you all rather face the Question?"

A murmur ran down the ranks—but no one spoke.

He ran his eyes over us again. It caught mine and I stared back truculently.

"Lyle!"

"Aye, reverend sir."

"What do you know of this?"

"I know that I would like to sit down, reverend sir!"

He glared at me, then I saw a gleam of amusement in his eye. "Better to stand before me, my son, than to sit before the Inquisitor." But he passed on.

For an hour or more he questioned us. Zeb and I came in for neither more nor less attention than the rest. At last he appeared to give up, and directed the Officer-of-the-Watch to dismiss us.

I was not particularly relieved, for it was a foregone conclusion that every word spoken had been recorded, that cinema records had been made of our very expressions, and that by this time the psychoanalysts were plotting curves, and checking our answers against our past behavior patterns.

Zeb is a wonder. We had no more than reached our quarters when he commenced to prattle of the night's events from a viewpoint of complete innocence. I caught the cue and groused about being treated like a bunch of pariahs. "We are officers and gentlemen," I protested. "If he thinks we are guilty of some offense, let him prefer charges."

I lay awake in bed for a long time, wondering about Judith, wondering frantically, whether or not she was safe. As I was reassuring myself for

the thousandth time, that the course of events indicated that the authorities were still in the dark, and therefore, she must have reached a hiding place, I felt a touch on my arm. I tensed, but relaxed when I was given the fraternal grip of the lodge. It was the Tyler-of-the-Watch, Peter, the lodge Master.

He pressed his lips to my ear. "Remain quiet," he whispered, "I must give you certain psychological treatment." I felt the bite of a hypodermic, the bruise of the injection. His voice droned close to my ear, softly, insistently. "You saw nothing unusual on watch tonight. Until the alarm was sounded the watch was quite without incident—" On and on, he droned, instructing my subconscious in a false memory pattern. I relaxed into unconsciousness.

I WAS AWAKENED by someone shaking my shoulder roughly. I sprang up, and faced four armed men. One of them had his blaster drawn and pointed at my middle. "Come along," he said brusquely.

They were wearing the uniform of the Angels of the Lord without identifying insignia. But each head was completely covered with a black mask which shrouded every feature but the eyes. By their masks I knew them; proctors of the Chief Inquisitor!

I assumed indignation. "What are you doing here?"

"Come along."

"Show me your order!"

The leading figure gestured with his blaster. Two of the others took my arms and urged me roughly toward the door, the third falling in behind. I shook at them and protested. "You have got to let me dress. You've no right to drag me out half naked, no matter what nonsense I may be accused off!"

He hesitated. "Hurry up, then!"

I thought furiously as I pulled on my clothes. How could I leave some sign that would serve to indicate what had happened to me? I stalled as long as I dared, pretending to jam a zipper on my boots, and fumbling clumsily with all my dressing. An idea finally came, not a good one, but it would have to serve.

I pulled down a sweater along with some other clothing and threw it on the bed. As I selected the clothing I needed to wear I contrived to arrange the arms of the sweater so that it simulated the position a brother of the lodge assumes in giving the Grand Hailing Sign of Distress. I announced that I was ready, praying silently that some brother would see it and guess the meaning before my room servant policed my quarters.

I was blindfolded before we reached the inner Palace. We went down six flights of steps, four below ground level, as I figured it; and reached a compartment filled with the breathless silence of a vault. The hoodwink was stripped from my eyes. I blinked.

"Sit down, my boy, sit down and make yourself comfortable." I looked into the face of the Chief Questioner himself, saw his warm, friendly smile and his collie-dog eyes. "I am sorry to get you so rudely out of a warm bed, but there is certain information needed by the Church. Tell me, my son, do you fear the Lord? Of course, you do; your piety is well known. And you love the Prophet, don't you? Of course, of course. Then you won't mind assisting me in this little matter. It's to the greater glory of God." He turned to his black-robed assistants, hovering behind him. "Make him ready—and pray be gentle."

I WAS HANDLED quickly and roughly, but not painfully. There was something about the touch of these operators that seemed to show that they regarded me as so much inanimate matter to be handled as impersonally as cordwood. They stripped me to the waist and fastened certain apparatus to me; a rubber bandage tight about my upper arm, electrodes to my wrists, a tiny mirror to the pulse on my throat. At a control board on the left wall one of them made a few adjustments, threw a switch, and on the opposite wall a shadow show of my inner working sprang into view.

A little light danced to my heart-beat, my blood pressure's rise and fall was plain, and other data whose meanings were unknown to me, were spread to view. I concentrated on remembering the natural logarithms from one to ten.

"You see our methods, son. Efficiency and kindness, those are our bywords. Now tell me—*Where did you put her?*"

I broke off with the logarithm of twelve. "Put who?"

"Why did you do it?"

"I am sorry, reverend father, I don't know what it is I am supposed to have done."

Someone slapped me hard, from behind. The little lights on the wall danced and jiggled. The Inquisitor studied them thoughtfully for a moment, then spoke to an assistant "Inject him."

For a second time that night a hypodermic pricked my skin. They allowed me a short reprieve while the drug took hold. I continued with the effort of recalling logarithms. But that became too difficult. I was growing drowsy, lackadaisical. Nothing seemed to matter. I felt a mild and childish curiosity about my surroundings. The soft voice of the

Questioner broke in on my reverie. I answered mechanically, the first thing that came into my head.

I have no way of telling how long this went on. They brought me back to sharp reality with another hypodermic.

The Inquisitor was examining a slight bruise and little purple dot on my right forearm. He glanced up. "What caused this, my boy?"

"I don't know, reverend sir."

"I am not so naïve as that. You are causing us a great deal of trouble. That is regrettable." He motioned to his crew. They strapped a helmet on my head. "Look here, Lyle." He pointed to a diagram on the wall. "You will observe that this is a representation of the brain, that bulbous part is the thalamus, covering it is the cortex. The sensory centers of the brain are marked for you to see. You may know that the nerve action of the body has certain electrical effects. We have analyzed your electrodynamic characteristics. I am afraid I shall find it necessary to heterodyne your normal senses." He nodded. "Commence."

A light blinded me. An explosion crashed in my ears. My right leg jerked with pain. "Where did you put her?" My throat contracted and I choked. A noise started low and soft, then climbed higher and higher, until it screamed out beyond audibility. Something struck me in the solar plexus; I doubled up. Then I itched intolerably. "Who helped you to do it?" Then commenced a rhythm of pain and agony. Light—sound—pain—sound—heat—cold pain— "Who told you to do it?" Pain and light—sound and pain— "Where is she?" Searing heat—sound—pain and light— "Why did you do it?" Silence—pain and sound.

I suppose I fainted.

Someone was slapping me across the mouth. "Wake up, Lyle, and confess! Zebadiah Jones has given you away!"

I BLINKED and said nothing at first. It was not necessary to simulate a dazed condition beyond speech. But the words had been a tremendous shock and my brain was racing furiously. Poor old Zeb! Hadn't the lodge Master had time to give him psychological treatment, too? It never occurred to me to suspect that Zeb had broken under torture alone. I naturally assumed that they had tapped his subconscious mind. I wondered if he were already dead. And I had gotten him into this. My heart was heavy with remorse.

My head jerked from another numbing blow. "Wake up! You can hear me—Jones has revealed your sins!"

"Revealed what?" I mumbled.

The Chief Inquisitor motioned assistants aside and leaned over me, his kindly face full of concern. "Please, son, do this for the Lord—and for me. Don't go to judgment with this sin on your soul. Confess, and let death come with your sins forgiven."

"So you intend to kill me?"

He looked faintly annoyed, and changed his tack. "I did not say so. I know that you do not fear death. What you should fear is to meet your Maker with your sins still on your soul. Confess!"

"Reverend sir, I have nothing to confess."

Instead of replying to me he gave instructions to his staff in low, gentle tones. "Resume. The mechanicals this time; I don't wish to burn out his brain."

It would be unkind to tell in detail, what he meant by these instructions. His notion of mechanical

methods differed in no important respect from the technique used in the Middle Ages, nor from those used more recently in China, except that—his knowledge of neural anatomy was incomparably greater, and his knowledge of the psychology of behavior made his operations more adroit. In addition, he seemed completely free from any sadistic emotion in his work, and was, therefore, more coolly efficient.

But I shall omit the details.

I have no idea of the passage of time. I must have been unconscious several times—at least, I remember being brought around more than once with stimulants and ice. I don't think I told them anything of any importance; not while I was conscious, at any rate, and the lodge Master's instructions to my subconscious may have protected me while I was out of my head.

I recall vaguely, coming semi-awake at one time, and hearing a voice. "He'll do. His heart is strong."

Finally I awakened as if from a long sleep. I was stiff, and when I shifted my weight my side hurt me. I opened my eyes and looked around. I was in bed in a small, cheerful room. A sweet-faced young woman in a nurse's uniform came smoothly to my side and felt my pulse.

"What's happened?" I asked her. "Is it all over, or is this just a rest?"

"Be quiet," she admonished me, "you are still too weak to talk. You are safe among the brethren."

"I was rescued?"

"Yes; now be quiet." She held up my head, and gave me something to drink. I went back to sleep.

IT TOOK some days for me to convalesce and catch up on events. The infirmary where I spent the first few days was part of an extensive series

of apartments underlying the basement proper of a department store in the city. There was some sort of underground connection with the lodge room under the Palace. The owner of the department store overhead was a Past Grand Master of the lodge, and an important source of liaison with the outer world. The shelves of his store fed us and clothed us. By tapping in on his commercial lines we had visiphone connections with the outside. His delivery trucks were available to spirit fugitives to or from our clandestine quarters. His manifold commercial activities were a complete and plausible blind for our extensive operations.

Successful revolution is Big Business—make no mistake about that. In a modern, complex, and highly industrialized State, revolution is not accomplished by a handful of conspirators, whispering around a guttering candle in a deserted ruin. No, it requires countless personnel, supplies, modern machinery and modern weapons. And to handle these factors successfully, there must be loyalty, secrecy, and superlative staff organization.

I do not believe the Cabal would have developed as soon as it did, nor operated as efficiently for revolution, had not the lodge existed before the time of the First Prophet as an ancient, nationwide secret fraternity.

Zebadiah came to see me the first day of my convalescence. I was overjoyed. "Zeb!" I cried, "I was afraid you were dead."

"Why did you think that?"

I explained to him the dodge that the Inquisitor had worked on me.

He shook his head: "As a matter of fact, I was never even arrested." I must have shown my surprise, for he continued, "I have you to thank for that, old man. If you hadn't left a sign, I could guess at when you

arranged your sweater in the Grand Hailing Sign of Distress, we might both have faced the Inquisition and neither one of us come out alive. I went straight to the lodge Master. He ordered me to take cover in the lodge room and wait. Then he arranged your rescue."

Interested as I was, my mind wandered. "Zeb," I pleaded, "where is Judith. Can't you find her and bring her to see me?"

He looked puzzled. "Didn't they tell you?"

"Tell me what? No—I haven't seen anybody but the nurse and she won't talk. Don't keep me in suspense, Zeb. Has anything gone wrong? She's all right, isn't she?"

"Sure she's all right, but she's been gone for a week. In Mexico by now. We got a report back two days ago."

Relief and disappointment struggled within me. Relief won. "Well, that's that," I said, "for the time being. Did you say a week? What day is this?"

"It's been nine days since you were arrested, John. You were a sick baby—still are, in fact."

"I'm all right," I grinned, "I'm too tough to kill. But bring me up-to-date; what goes on in the Palace?"

"I don't know."

"Huh?"

"I haven't been back. You didn't think I was still on duty, did you?"

"I hadn't had time to think about it."

"Well, naturally, I couldn't go back after I had ducked to avoid arrest; I was through. No, my fine fellow, you and I are both deserters from the United States Army—to be picked up on sight, with every cop and every postmaster in the country anxious to earn a deserter's reward by turning us in."

I whistled softly, and let the implications of the remark sink in.

VI.

I HAD JOINED the Cabal on impulse, more or less. Certainly, under the stress of my newborn love for Judith, and in the excitement of the events that came crowding over me as a result of meeting Judith, I had had no time for calm consideration. I had known rationally, that to join the Cabal was to cut all my ties with my past life, but I had not realized it emotionally, deep down inside. What would it be like to never again wear the uniform of an officer and a gentleman? I had been proud to walk down the street, or to enter a public place, aware that eyes followed me and admired.

I put it out of my mind. My hand was to the plow—there was no turning back now. I was in this till we won, or until we were executed for treason.

The lodge Master called on me a couple of days later. He sat on the edge of my bed, and crossed his arms over his round paunch. "Feeling better, son."

"I could get up, if they would let me."

"Good. I've been trying to decide," he continued, "what to do with you." I raised my brows but said nothing. "It would be simple enough to assign you to a desk job here—we are shorthanded. I've had Zebadiah working sixteen hours a day, trying to straighten out the filing system—but it is wasteful to keep two smart young military men at desk jobs which civilians could fill. No, I think I will send both of you to General Headquarters, and let them put you to work."

"General Headquarters—where is that?"

"Out West. You'll know soon enough. Did you have any specialty at West Point, any subject in which you excelled?"

"I stood pretty high in ballistics, and in chemistry of explosives."

"Hm-m-m, good enough. How were you in applied miracles, and in mob psychology?"

"I was fairly savvy in miracles, but I guess I'm too dumb for psychodynamics."

"Well, we can't have everything. I could use another technician in morale and propaganda work, but if you can't, you can't."

"Zebadiah stood first in his class in mob psychology. The commandant tried to persuade him to enter the priesthood when he graduated."

"I know; Zebadiah would be a real asset to any propaganda unit, but he must go West, too. Zebadiah is too much interested in Magdalene. We don't believe in letting such couples work together in the same unit; it might distort their judgments in emergencies."

I SPENT several days on light duty reading proof on the *Iconoclast*, a smug, mildly critical, little reform-from-within newspaper which the Cabal used to pave the way for its field missionaries. It was a "Yes, but—" paper, just the sort of thing to arouse doubt in the minds of the stiff-necked and intolerant.

When the surgeon O. K.'d me for duty, the staff metamorphist took me in hand. He had me measured and photographed, recorded my voice, analyzed my walk, and had a master card made up of my physical characteristics. I watched the card-sorter go through several thousand cards, and was beginning to think that I was a unique individual, resembling no one else sufficiently to

permit me to be disguised successfully, when two cards popped out almost together. Before the machine clicked to a stop there were five cards in the rack.

"A nice assortment," the metamorphist mused as he looked them over, "one synthetic, two live ones, a deader, and one female. We can't use the woman, not for this job, but you might keep it in mind. It might come in very handy some day to know that there is a female citizen whose proportions and characteristics are so nearly like yours that you could impersonate her."

"What's a synthetic?" I inquired.

"Eh? Oh—it's a composite personality, very carefully built from faked records and faked backgrounds. A risky business at best, for it involves tampering with the archives in Washington. I don't like it, for there really isn't any way of completely filling in the background of a man who doesn't exist. I'd much rather patch a man into a real background of a real person."

"Then why do you use synthetics at all?"

"Sometimes we have to disguise one of the brethren and there is no available real personality for him to assume. Then we have to create one for him. That is particularly the case when we have to move a fugitive, like yourself, in a hurry. Now let me see," he added, shuffling through the cards, "we have two to choose from—"

"Just a minute," I put in, "why do you keep dead men in the file?"

"Oh, they aren't legally dead—when one of the brethren dies and it is feasible to hide the fact, we maintain his public personality for future use. Now then," he continued, "can you sing?"

"Not very well."

"I'm afraid this one is out, then. He's a concert baritone. I can make a lot of changes in you, but I can't make a trained singer of you. It's Hobson's choice. How would you like to be Adam Reeves, commercial traveler in textiles?" He held up a card.

"Do you think I could do it?"

"Certainly—when I get through with you."

A FORTNIGHT later my own mother wouldn't have known me. Nor, I believe, could Adam Reeves' mother have told me from her son. Reeves himself, was available to work with from the second week. I grew to like him very much while I was studying his personality, in order to imitate it. He was a mild, quiet man with a retiring disposition, which always made me think of him as small, although he was, of course, my height, weight, and bony structure. We resembled each other only superficially in the face.

But that was no obstacle to the staff metamorphist. A simple operation made my ears stand out a little more than nature intended; at the same time they trimmed my ear lobes. Reeves' nose was slightly aquiline; a little wax under the skin caused mine to match. It was necessary to cap several of my teeth in order to make our dental repair work match, and my skin had to be bleached a shade or two, since his work kept him less in the sun.

The most difficult thing in matching him physically, and the last to be applied, was artificial fingerprints. An opaque, flesh-colored plastic was painted on my fingers, then my fingers were sealed into molds made from Reeves' fingers. It was delicate work and hard to get a satisfactory result. One finger was done

over seven times before the metamorphist would pass it.

Much more difficult for me was the tedious drill in imitating Reeves' personal peculiarities—his walk, his gestures, the way he laughed, his table manners. These things taxed my mediocre histrionic talent to the utmost. My coach grew exasperated with my slowness.

"Confound it, Lyle, won't you ever get it? Your life will depend on it. You've *got* to learn!"

"But I thought I was acting just like Reeves," I protested.

"Acting! That's just the trouble. You were *acting* like Reeves. It was as artificial as a false leg. You've got to stop acting, and *be* Reeves. Try it now. Worry about your sales schedule, think about your last trip, think about commissions and discounts and quotas. Go on. Try it."

Every spare minute I studied the current details of Reeves' business affairs, for I would actually have to sell textiles in his place on the trip back to the coast. And I had to learn a whole trade, that of merchandising textiles. Before I finished with that I had acquired a new respect for business men. I had always thought that buying and selling things was simple, but I found it to be very complicated. There was a great deal too much detail to be learned by ordinary methods. I was forced to fall back on the old phonographic tutor stunt and wear earphones to bed. I never sleep well under those conditions; I woke up every morning with a splitting headache, and my ears—which were still tender from the operations—sore as two boils.

But it worked, all of it. In two short weeks I *was* Adam Reeves, commercial traveler, right down to my reflexes. I was allowed twenty-

four hours' rest, then the lodge Master sent for me and gave me my orders.

VII.

"LYLE," he said, "Reeves is due to catch the *Comet* for Cincinnati this afternoon. Are you ready to go?"

"Yes, sir."

"Good. What are you to do?"

"I am to carry out my—I mean his—selling schedule from here to the coast. I check in at the West coast branch office of United Textiles Co., and proceed on his vacation. In Phoenix, Arizona, I am to attend church services at the South Side Tabernacle. I am to linger after the services, and thank the priest for the inspiration of his sermon, in the course of which I shall reveal myself by means of the accustomed usages of our order. He will enable me to reach General Headquarters."

"Quite correct. In addition to transferring you for duty, I am going to make use of you as a messenger. Report to the psychodynamics laboratory at once. The chief technician will instruct you."

"Aye, sir."

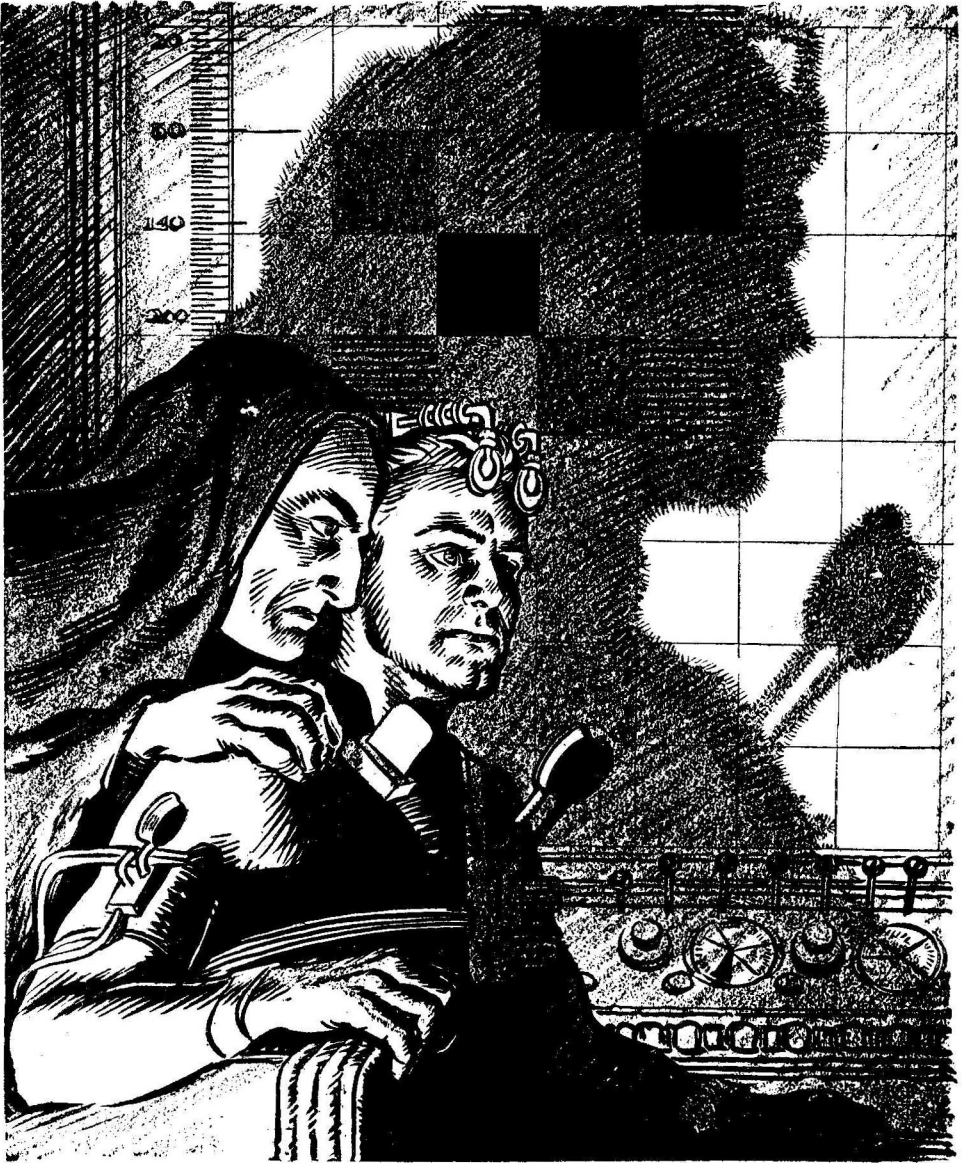
The lodge Master rose from his chair, and came around his desk to me. "Good-by, my son. I sha'n't see you again before you leave. Guard yourself well, and may the Great Architect aid you."

"Thank you, sir. Is it permitted to inquire—is the message I carry of great importance?"

"Quite important?"

I shall have to be satisfied with that, I thought, as I bade him good-by, but I shall know what the message is in a few minutes.

I was mistaken; I did not find out. At the psychodynamics laboratory I was told to sit down and



"Confess, John! It's useless now. Jones has spoken, and told us the truth—he failed you!"

relax. "Prepare yourself for hypnosis, Brother. Make your mind easy, and as free from thought as you can." I relaxed and waited. Presently I drifted off.

I came to with the pleasant, calm glow which usually follows hypnosis.

AST—3

"You're all through," I was told, "carry out your orders."

"But how about the message I was to carry?"

"You have it."

"Hypnotically? But if I am arrested, I'll be at the mercy of any

psycho-investigator who examines me!"

"No, you won't be. Don't you worry. Your instructions have been keyed to a signal word, and your subconscious mind has been told not to remember until it hears that word. You cannot possibly give away the message, awake or asleep, until you hear the signal."

I glanced at my telechronometer, and was surprised to see how late it was. Apparently, I had been under hypnosis for the better part of two hours. I must hurry.

THE ROCKET PORT at New Jerusalem is more conveniently located than it is at most of the older cities. There was a transtube station just across from the department store which hid the Cabal headquarters. I located the tube marked "Rocket Port," found an empty cartridge, and strapped myself and my luggage in. The attendant sealed me in, and almost at once I was at the port.

I bought my ticket, then took my place in line at the end of the queue, outside the police station. In spite of myself, I was a trifle nervous. Here was the first test. I must get my travel pass validated under the suspicious eyes of police officers, who, no doubt, were on the lookout for John Lyle, renegade army officer.

The line moved slowly. The police seemed to be taking an unprecedented amount of time with each passenger. That did not seem encouraging and my nervous fears increased. But the wait itself helped me. By the time my turn came, I had myself in hand. I presented my papers to the sergeant. He thumbed through them deliberately. I glanced at the station chronometer, and back at the timepiece on my wrist.

The sergeant looked up. "Don't

worry about catching your ship," he told me, not unkindly, "they can't leave until we clear their passenger list." He shoved a pad under my nose. "Your fingerprints, please."

Silently, I made the necessary imprints. He glanced at them, at the prints in my travel pass, and the prints in their files which Reeves had made a week before. "That's all, Mr. Reeves. A pleasant trip."

I thanked him, and left.

The *Comet* was not too crowded. I selected a seat by a window, well forward, where I could watch the captain and the navigator at the controls. I had just settled down, and was unfolding the late afternoon edition of the *Holy City*, when I felt a touch at my arm.

"Will you step outside, please?"

It was a police officer.

I was herded outside along with four other male passengers. The sergeant was quite decent about it. "I'm afraid I must ask you four to return to the station for further identification. I'll order your baggage removed, and have the passenger list changed."

I let out an exclamation. "But I must be in Cincinnati, tonight!"

"I'm sorry." He turned to me. "You're Reeves, aren't you?"

"Hm-m-m, you're the right size and build. Still—let me see your pass again. Didn't you arrive in town just last week?"

"That's right."

He went through my papers again. "Uh, yes—I remember your arrival; it was Tuesday morning on the *Pilgrim*. Well, you can't be two places at once, so you can't be the chap we are looking for." He handed my credentials back to me. "Get back in the ship. Sorry we bothered you. You others come along."

I returned to my seat, and picked

up my newspaper again. A few minutes later the first heavy surge of the rockets threw us toward the west.

THERE must be a peddler's pack somewhere on my family tree. I not only kept Reeves' business engagements in Cincinnati, I enjoyed it as well. I actually bettered his quota and earned him quite a bit extra in commissions. I don't quite understand it, but I found that I got as much intellectual and emotional satisfaction out of persuading some hard-boiled retailer that he should increase his line of yardage goods, as I had ever gotten out of military work. I ceased to worry about my disguise at all, and concerned myself exclusively with the subject of textiles.

I left for Kansas City on schedule, and had no trouble with the police in getting a visa on my travel pass. Nor for that matter, had they questioned me in more than a routine fashion on my arrival. As the rocket was fairly well filled I was forced to share a seat with another passenger, a well-built chap in his middle thirties. We looked each other over when we sat down, then each went about his own affairs. I called for a lap table and busied myself by straightening out the order blanks and other papers which I had accumulated doing business in Cincinnati. He gave his attention to the news broadcast flashing on the television screen at the forward end of the car.

I felt a nudge some ten minutes later, and looked around. My seat mate flicked a thumb toward the televue screen. There displayed was a scene in some large city, presumably in the United States. I saw a large public square filled with a restless mob. They were surging toward a massive temple over which floated

the gold-and-crimson banner of the Prophet and the slim pennant of a bishopric. As I watched, the first wave of the crowd broke against the temple steps. A squad of temple guides trotted out of a side door to the left of the massive front doors of the temple and set up their tripods on the broad terrace at the head of the steps. Then the scene shifted to another viewpoint. We saw the crowd hurrying toward us, and close up. Apparently, the operator was using a telephoto lens from somewhere on the temple roof.

What followed was as beastly a thing as I have ever been forced to watch. Instead of blasting them mercifully out of existence, the guards had aimed low and were burning off the legs of the rioters. One moment the first wave of the mob was running toward me up the steps; the next they stumbled and fell, the cauterized stumps of their legs jerking convulsively.

I snatched up the headphones hanging behind the seat in front of me and listened. "—apolis, Minnesota. The situation is well in hand, and, in all likelihood, no additional troops will be required. Bishop Jennings has declared a temporary state of emergency, and martial law will rule until order is restored and the ungodly instigators punished for their sins. A period of prayer, fasting, and penance will commence at once.

"The ghetto has been closed and all local pariahs with their families will be transferred to the reservations in Wyoming and Montana. Let this incident be a warning to the ungodly, everywhere, who might presume in their wicked hearts to dispute the divine rule of the Prophet Incarnate!

"You have been observing a spot-

news broadcast made by the Argus News Service through the facilities of the National Televue Network. "There will be a short pause for—"

I took off the phones. Why blame the pariahs? That mob wasn't made up of pariahs; I saw their faces.

I COULD SEE that my companion was affected by the grisly sight we had just seen, but I could not tell in just what way it affected him. I let him speak first.

"Serves them right, the fools! What possessed them to go charging up against a fortified position like that?" His words were low, but intense. I think he spoke more to himself than to me.

"Why did they riot?" I inquired.

"Eh? Blessed if I know. There must be some heresy abroad up north." He frowned and pinched his lip. "I can't see why anyone should want to rebel against the officers of the Holy One."

I agreed. "Leaving religion out of it," I added, "for there is no accounting for the crazy notions of a heretic, there can be no doubt that the government is doing a good job of running the country. Business is good—it has been for me, at least." And I smiled contentedly.

We discussed politics, business conditions, and the like, for some time. He seemed a simple, harmless fellow, conservative and conventional. As we talked I looked him over. I was uneasy for some undefined reason—perhaps some sixth sense of the hunted. Some peculiarity about his hands caught my eye. What was it? I glanced back at them. No, nothing out of the way.

Then I noticed it again—nothing of importance. He had a calloused ridge on the last joint of the third

finger of his left hand—just a ridge as my West Point class ring had left on my hand. But it meant nothing; lots of men wore heavy seal rings on that finger. I did, myself, in imitation of Reeves. Still—if he had worn a big, heavy ring on that finger for many years, why had he stopped?

It seemed a trifling thing to worry about, but a hunted animal lives by noticing trifles. I was never considered very bright in psychology—it had kept me from winning cadet chevrons at the Point, but now might be a good time to make use of what little I had learned. I ran over our conversation in my mind, and recalled his first remark. The first thing he had noticed about the news broadcast was the recklessness of the mob's charge. That seemed to bespeak a military viewpoint.

While we were chatting the steward served tea. In leaning across my companion to serve me, he slopped a cup of hot tea, splashing my companion who let out a yelp and muffled exclamation.

"B. J. oaf!"

I helped him repair the damage with my handkerchief while thinking furiously. B. J.! That was an expression used by West Pointers and no others. A civilian would have said awkward, clumsy, or fresh—never B. J. Therefore, he was not what he purported to be, but an army man. Since he was not wearing his ring, and gave no indication of his profession in a rather long chat, he must be deliberately concealing his identity. Ergo, he was probably a Secret Service operative.

Was he after me? If so, he had made two bad breaks in my presence. Perhaps he wasn't assigned to me, perhaps it was sheer accident that we were together. Even so, only the clumsiest tyro would make such slips

in maintaining an assumed identity. Now the army secret service was not clumsy. It was directed by some of the most subtle brains in the country. It was contrary to reason that this chap should be lacking in finesse—if he *were* a secret agent.

There was an inescapable conclusion: Assuming that he was what I suspected him to be, then he had given himself away to me on purpose, *in order that I might suspect him!* But why? Obviously, I was under suspicion—apparently they intended to make me nervous, to spoil my judgment. Why? It could not be simply that they were not sure that I was the man they wanted. Had that been the case, I would have been arrested and put to the Question. They must desire me to be free, but frightened; in order that I might run for cover, and *lead them to my fellow conspirators.*

When I first became aware that my companion must be a spy on my trail, I *was* frightened—filled with that cold, nauseating fear that can be compared only to seasickness—but now that I thought I knew their motives, I was calm again. What would Zebadiah do? “The first principle of successful intrigue is not to be surprised into any unusual action—” That was the tip, sit tight and do nothing. Play dumb. That ought not to be hard—for me.

I ARRIVED at Kansas City, checked in at the port police station, and went about my business. The fascinating details of merchandising soothed my mind and made me forget that I was a fugitive, who might expect arrest at any moment. I caught sight of my erstwhile companion one day, coming out of the New Muehlbach Hotel as I was going in, but our eyes did not meet,

and I ignored him. But I was glad, at last, to be aboard the rocket for Denver, and to note that he was not a passenger. That was no assurance that I was not followed; perhaps my relief was unreasonable.

We grounded at the new field adjoining the town of Aurora, ten miles east of downtown Denver. The police examined my papers and fingerprinted me in a perfunctory-enough fashion. I was about to stuff my passbook into my wallet, when the desk sergeant said: “Bare your left arm, please, Mr. Reeves.”

I asked for an explanation, even as a white-jacketed orderly with a red cross on his sleeve was sponging the hollow of my elbow and inserting a needle.

“Just a routine matter, Mr. Reeves,” I was told, “the public health commissioner must protect the mountain resorts against the spread of epidemics.”

It was a thin explanation, and seemed thinner yet, when, after the orderly had taken a ten c. c. sample of my blood, I was required to wait in a side room of the police station.

I had plenty of time to consider. The situation didn't look bright to me. I knew of no medical precaution peculiar to the mountain States that would necessitate some sort of blood test for ordinary travelers—and yet the excuse was sufficiently plausible that I could not afford to take alarm and try to escape.

The room in which I waited was a temporary structure, hastily erected on the new field. All that separated me from the sergeant's office was thin bulkhead of molded plastic. I could hear muted voices on the other side. Possibly if I pressed my ear to it, I could make out the words. On the other hand, I could not afford to be found eavesdropping.

I moved a chair over to this thin wall, and sat down, leaning back on the two rear legs of the chair in such a fashion that the top of the chair back, my shoulders, and the back of my neck were pressed against the wall. Then I pretended to read a discarded newspaper I had picked up from the floor.

By turning my head I could press one ear against the wall. I waited and listened.

For some minutes nothing was said that was of interest to me. The sergeant told a story to his clerk—one which would have resulted in a fortnight's penance had a proctor overhead him—and was rewarded with ribald laughter. Some routine reports came in. I waited.

Facing me as I listened, was an open window looking over the rocket field. A small ship appeared on the horizon, swelled at once to a gaudy streamer of fire, circled the field, and landed about a quarter of a mile away. The pilot taxied toward the administration buildings on his auxiliary motor, and parked outside the window, not twenty-five yards away.

I recognized her type at once; she was a Sparrow Hawk, mark *III*, a speedy little pursuit job with fractional controls as well as gyros, seven tail jets set in a three-degree cone, and an eighteen-hundred-mile radius at cruising speed. I knew her as well as I knew my own hands, for I had pushed one just like her, playing sky-polo for Army. That was the year we had licked both Princeton and Navy.

The pilot got out and walked away. I measured the distance to the ship with my eye. If the ignition were not locked—I looked at the window. It might be equipped with

vibrobolts; if so, I would never know what hit me. But I could make out no indication of the necessary power leads, and trigger connections. More probably, in such a temporary structure, there would be nothing but contact alarms on the sill and frames. There might not be even so much as a selenium circuit.

I became aware of talking on the other side of the bulkhead, and strained my ears.

"What's the blood type?"

"Type one, sergeant."

"Does it check?"

"No, Reeves' is type three."

Oh-o! Make a priority call to Main Laboratory; we're taking him into town for a retinal."

I needed no one to interpret these cryptic remarks. I was caught! Since my blood type didn't check, they knew positively that I was not Reeves. Once in Denver, and the blood-vessel pattern of the retina of either of my eyes photographed, it would be just a matter of time until they knew with certainty, my real identity—the time necessary to telestat it to the Bureau of Investigation, and receive a report.

I dived out the window.

I lit on my hands, rolled over in a tight ball, was flung to my feet as I unwound. If I set off an alarm, I didn't hear it as I pounded toward the little flyer.

The door was open, jets were warm, and the ignition was *not* locked. There was help for the son of a Widow! I didn't wait to taxi clear, but blasted away at once, hoping that my exhaust would demoralize pursuit. We bounced over the ground, the little darling and I, for perhaps a mile, then I lifted her bow ten degrees with the gyros, and scooted away to the west.

IN TIMES TO COME



Crowded somewhat this month, by the necessity of an Analytical Laboratory reporting on two months' issues, this department can report only essentials.

First, is the fact that next month presents another astronomical cover—an unusual view of Uranus. Being merely a featureless, cloudy ball, Uranus would not ordinarily offer a striking astronomical study, but by picking a particular moment, under exceptional circumstances, the artist—Gilmore—has gotten an extremely beautiful picture.

Among the stories: I suspect there is going to be some question in the minds of those who have read Heinlein's first part of "If This Goes On—" as to whether he can maintain the power and sweep in the second installment. He does. If anything, he exceeds it. Particularly recommended in next month's installment: the names of the giant land cruisers used in attacking New Jerusalem; his analysis of the science of propaganda; the magnificently interlocking police measures he suggests; the communication methods used in the final battle.

THE ANALYTICAL LABORATORY

First, the held-over Laboratory report on the November Astounding. We were not surprised to find "Gray Lensman" taking first place easily. The next three places were hard-fought. Having promised to report panings as well as bouquetings, I feel bound to report that "Spacewreck" and "This Ship Kills" got an even balance of praise and condemnation, probably, I suspect, largely because of unusually strong competition, rather than by any reason of lack of individual merit.

- | | |
|---------------------------|-----------------|
| 1. Gray Lensman (Part II) | E. E. Smith |
| 2. Power Plant | Harl Vincent |
| 3. Habit | Lester del Rey |
| 4. Misfit | Robert Heinlein |

Second, the Laboratory for the December Astounding:

- | | |
|-------------------------------|----------------|
| 1. Gray Lensman (Part III) | E. E. Smith |
| 2. Discord in Scarlet | A. E. van Vogt |
| 3. Sculptors of Life | Wallace West |
| 4. City of the Corporate Mind | Nat Schachner |
| 5. The Nova | Edwin K. Sloat |

And, on that issue, there was a tooth-and-nail fight for places from top to bottom!

LOCKED OUT

He felt unutterably foolish—locked out of his one-man spaceship by dumb moves. Took him a while to realize that maybe it wasn't funny at all—

By H. B. Fyfe

Illustrated by Frank Kramer

THE ODDS were who knows how many million to one, but it had happened.

"It *would* be me," grumbled Keith. "Just my luck. No matter where that damned pebble was going, I'd have been right in the way. And on top of that, I have to go and make it worse!"

He swore. That was before he had begun to realize how serious his situation really was.

Here he was, three days out of Mars, a quarter of the way to the nearest asteroids, sitting on the outside hull of his rocket. And likely to stay there because he was locked out.

It had started when Keith, an asteroid prospector on his way from Mars, had put on his spacesuit and gone outside to see what had happened when a diminutive meteor had glanced off his small, one-man rocket. From the feel of the blow, he had judged it to have hit on or near the port air lock. Then he had found that the lock would not open from the inside.

In a rush to detect any injury to his craft, Keith had hurried to the other port on the opposite side of the ship. He had passed through and paused briefly to close the outer door by means of the external control

lever set into a hollow beside the port. That was when he had fixed things.

He must have pulled the lever too roughly in his haste. The port, instead of swinging neatly shut, had jammed while still ajar. Something had gone wrong with the operating mechanism.

Keith had been annoyed but not worried. The port would neither close completely nor open, but he had decided to leave it until he had seen the other damage.

Judging from the groove in the metal of the hull, a meteor about the size of a football had struck the rocket a glancing blow. The whole port was dented, and where the groove crossed the edge of it to continue across the hull, the door was fused tight.

Fortunately, there was no air leak.

So now, he was locked out. Keith sat cross-legged on the hull beside the port and contemplated it glumly. He was not worried yet, but he did not know just what to do. All he had with him in the way of tools was an iron bar he had carried with some vague idea that he might need to pry out the meteor if it had penetrated. There was a six-inch knife in a sheath at his belt, part of his suit equipment, and he had, of course,



He pried angrily at the stubborn lock door. It didn't budge.

his flashlight; but they did not seem to be of much use.

The port, a cylinder two feet thick, closed flush with the hull. Its narrow, half-inch-thick rim fitted snugly into the hull around the entrance where there was a corresponding depression in the streamlined metal. True, there was a deep groove in it, but he did not see how he could get a purchase for his iron bar. He fervently prayed that no other pros-

pector might come along the same curve from Mars and catch him in this ridiculous plight. The story would spread to every spaceport in the system: how Tom Keith, the space-dopey prospector, had locked himself out of his own ship.

TIRED OF SITTING there idle, he rose and walked across the top of the ship to the starboard air lock. "This was open about two inches.

Here the ruddy glow of the hull, faintly lit by the red planet beyond the stern, was supplemented by the gleam of the electric bulb inside the air lock. Since the outer door was still partly open, this had not been automatically turned off. The projecting rim, two feet or more from the hull—the thickness of the door plus the inches it was open—offered him an opportunity.

"And then," pondered Keith, "there might be something to be done with the wiring of the control lever."

He had a pocketknife with an assortment of blades that included a screwdriver, but it was where it naturally would be when he wanted it—in his pocket, under the spacesuit. Maybe he could use his sheath knife if he had to.

Taking a small mirror that hung on a chain from his neck, he looked at the dial of the oxygen tank on his back. His oxygen, he estimated, was good for two hours. Meanwhile, he had better be doing something.

Keith took a grip on his bar and tried to insert it into the opening left by the jammed port. He cursed a blue streak when he found that the bar was a fraction of an inch too thick. With the persistence of anger he attempted to force it. With the result, not unnatural, that it slipped, allowing him to project himself into space as the resistance suddenly disappeared.

"Oh, hell!" swore Keith as the metal of the hull receded. He knew he would float back, given time, since the ship was the only matter hereabouts to attract him. Nevertheless, it was hard to watch himself losing contact with the only haven he had, the only solid, material thing anywhere near him.

He floated there in the dark of

space, with a million sparkling gems of light surrounding him, making it all seem like a dream. He felt fear creeping upon him, and almost reached out for something in reaction to man's age-old instinctive fear of falling.

It was nearly fifteen minutes before his eager feet stood once more on the hull. He resolved to be more careful in the future.

This time he moved farther around the port, where the gap between the rim and the hull was less. He fitted the end of the bar under the projecting rim. He soon found that it was too narrow to hold the end of the bar when he lifted up on his end, and he had no weight to speak of with which to push it down. There was no place he could get leverage.

"Let's see," he muttered to himself, "I wonder if I can put the bar lengthwise under the rim and pull on both ends. Maybe I just ought to slam it one, and trust to the jar to loosen it. Still, I think I'd better not try that yet—" He felt along the rim with clumsy gloves. "I hope to Sol none of the other boys come along this curve and find me like this before I have a chance to get in. I doubt it, though. I took off ahead of them all, and I'm still going."

Yes, he was still going. Now that he would be willing to turn back to Mars, as he should have immediately he was struck by the meteor, he could not reach the controls.

He took one end of the bar in each hand, bent, and slipped the middle under the rim, tangent to the main cylinder of the door. Then he pulled hard to straighten up. A man's strength in space, free of gravity, was considerable; perhaps he could force the port into a plane parallel with the hull.

UNFORTUNATELY, gravity—or its absence—did not much affect the present situation. The port resisted with all its powers of friction and insisted on remaining jammed. Keith had a second's exultation when he felt something give slightly, but he discovered that he had merely bent the rim. He bent it in two other places, then gave up.

"Well," he thought, "I'll see about that lever."

He drew his sheath knife and focused his flashlight on the control lever. He confirmed what he already knew: that the lever moved easily enough but without producing any results. He began to unscrew the metal fitting that protected its base. Perhaps the wiring—

In spite of frequent slips of the knife point, he finally succeeded in ripping out astonishing quantities of fine wire without gaining any knowledge of what might be the trouble. There did not seem to be much to lose, so he did not hesitate to tinker. The lever remained impassive to all manipulation.

"Well, it's a cinch I'm not getting anywhere this way," decided Keith at last.

He sheathed his knife and stood up stiffly. There was nothing he could think of that would help here. He walked toward the nose of the ship, thinking hard.

It was beginning to dawn on him that the situation might be more than annoying. It might become—dangerous. Fantastic, he thought, that such a trivial slip as closing a port wrong or pulling a lever a little too roughly could result seriously; and yet—here he was, the sardine on the outside of the can. And without a can opener!

"To tell the truth," Keith told himself, "I *don't* quite see how the hell I'm going to get inside. And

I certainly can't stay out here for the rest of the trip!"

He stood on the unbreakable glass of the control room portholes and gazed longingly down at the lighted room. There was the control desk, its levers and push buttons and dials shining leeringly up at him; there was his padded chair, equipped with straps for take-offs so that he would not break his silly neck with the shock of his rockets; there were the instruments he had laid aside— Only a few feet away, yet more surely out of his reach than the very stars.

"NO!" shouted Keith, and the sound thundering in the confines of his helmet. "There must be *some* way out—I mean in. I just haven't thought of it yet. This is too damn silly for words. Lock myself out! Hell! It just isn't done!"

He strode aft for want of something to do. He stood disconsolately on the rocket tubes, awaiting inspiration. Off to the starboard a star moved. He stared. Another ship!

Keith scurried around the rocket tubes until the tapering tail was between him and the moving dot of light. It must be Larry Jensen's *Firefly*. She was the only ship that could have overhauled him so quickly. Larry carried a crew of four, which meant there would be that many more idle eyes on the look-out for another ship. He hoped none of them had happened to have a glass on his ship. They might become curious and investigate, in which case he would become a laughingstock. The man who locked himself out!

He skulked for some time on the far side of the ship, walking moodily up and down. Inspiration was courteous; it did not interrupt his thoughts. It looked as if he would have to sit out here until the rocket

arrived at the asteroid belt. Even longer, because there would be nothing to stop it then.

"Wow!" he remarked to himself. "That's the answer. What do I use to stop when I land in a planet? The parachute. And where is the parachute carried? On the topside, with a sliding hatch in the hull to let it out. Tom, my boy, you've got it at last. There's a manhole at the bottom of that 'chute compartment, I know."

He bounded forward, peeped cautiously around the hull to make sure the *Firefly* was going about its business, then made straight for the parachute hatch.

KEITH HAD some difficulty in locating it at first, since the metal fitted very precisely and he did not wish to attract possible attention by the use of his flashlight. Toward the bow was a triangular flap that was raised by the lever that thrust the small pilot 'chute out during a landing. Reaching aft from this was a hatch that slid back as the main parachute was pulled from its compartment.

He drew his knife and tried to probe into the fine crack where the triangular flap came to a point over the sliding hatch. The blade was not thin enough to go in very far. He estimated that it reached no more than half an inch, and the metal was thicker than that.

Nevertheless, he slid the point along the crack from one end to the other. There was apparently no catch that could be opened, no way of prying up the flap. He went all around the hatch, with no success. He could insert the knife hardly at all into the horizontal slits where the sliding part of the hatch fitted smoothly under the streamlined outer metal.

Enraged at his helplessness, Keith seized his bar and swung viciously at the flap where the base of the triangle formed the end of the rectangular hatch. Except that he nearly lost his grip on the bar when it bounced off, nothing happened. He could detect only a small scratch.

"Not even a dent," he muttered disgustedly, and sat down on the hatch. "Well, wrong again. What now, I wonder?"

He lifted the mirror and read the dial of his oxygen tank. He had about an hour before he had to change to his emergency tank. Meanwhile, he *must* think of something.

"Let's see," he conferred with himself, "I've got to analyze this systematically. Parachute hatch—out of the question. Port lock—smeared by meteor, nothing doing. Starboard lock—jammed. Well, maybe I could jar it open."

He took the bar and went over to the air lock. After trying once more in vain to pry it open, he knelt on the hull. He took a good hold with his left hand on the wires dangling from the cavity left by the control lever, and gripped the bar by one end. Then he put a good-sized grunt into the swing and brought the bar down on the jammed port.

The port stayed just as it was, except that the rim showed one more dent in its battered surface.

He swung again with everything he had, and this time he made an obvious mark. The port still did not budge.

"It can't be!" cried Keith. "If I can make a dent in *that*, it ought to move!"

The air-lock door thought not. Keith subjected it to a really insane battering, crumpling the thin rim and leaving marks of his rage all over the port; but he was not reach-

ing the source of the trouble. The jam-up was somewhere inside the air lock, in the mechanism rather than in the door, which served merely to protect the jam.

The bar bent beneath the weight of his blows. Finally, brittle because it had had time to radiate away the greater part of the heat it had possessed when he had brought it out, it snapped in half.

He staggered to his feet, staring at the half left in his hand with an expression of hurt surprise. The other piece had already disappeared into the dark of space.

Keith never knew how long he stood there staring at the broken bar, the symbol, it seemed, of his helplessness—of man's humble power compared to the cruel, cold strength of the void. At last he roused and hurled the piece of iron after the other. He knew vaguely that he ought to have kept it. He did not have so many assets just now that he could afford to fling them away.

KEITH TOOK to walking around and around the ship. It was better, he found, than standing still. It was in the course of this pacing that he was brought to a halt by the thought of what lay opposite the parachute hatch. On the bottom of the ship were the compartments from which the three rectangle landing wheels were let down.

He turned back and found the spot. It seemed strange to be looking down at them instead of lying on his back in the dirt of a spaceport field to examine them. Nevertheless, he located the places where they were concealed. The sight cooled his ardor.

There was even less chance than at the 'chute hatch.

"And even if I did open one somehow," he reflected, "there's no chance

of passing anything as big as a man through that little hole, assuming that I could get the wheel out of the way in the first place."

He turned away and began to walk up and down. The sky watched him with a million bright, tiny eyes, waiting—waiting.

"Come on, Tom," he muttered. "You can't leave it at this. Aren't there any other openings in this can?"

He pivoted at the end of his beat and started back toward the rocket tubes. The rocket tubes!

The rocket tubes! He tried to run in his excitement, and took off again, floating his leisurely way sternward and swearing colorfully. Gradually he settled to the hull. By the time he had, and had reached the rockets, the first enthusiasm had worn off.

"Humph!" he grunted. "They're not any too big. Especially the six in the circle. Guess I'd better try the main one in the center. I can swing myself down by this little steering rocket—there!"

He maneuvered himself past the gaping muzzles that had blasted him away from Mars and thrust his helmet into the main tube.

He switched on his flashlight; for, though the distant Sun and Mars lit the ship from aft, little light slipped past his bulky, spacesuited figure. He noticed that the lining of the tube was already somewhat pitted and worn from the explosions of the liquid hydrogen and oxygen.

"And Horner swore he did a first-class relining job! Wait till I get hold of him!"

Then it occurred to him that he might never again "get hold of" anyone. He crawled ahead. The light finally showed the end of the tube. There were three holes there, a

smaller one between two others. The two larger holes supplied the liquid hydrogen and oxygen, while the small one injected kulite, the synthetic catalyst that lowered the temperature of the furious explosives without lessening the drive.

Keith looked curiously at the slightly projecting jets of the firing mechanism, which studded the circumference of the tube about a foot from the end. He had never been inside a rocket tube before—that was usually left to those repair men who made a specialty of it—but he could see how they spat out sparks to ignite the fuel sprayed through the grills over the fuel vents.

He sought for some way of getting through. Perhaps something was removable. Perhaps the base of the tube could be unscrewed. No, the rocket tube was a solid unit, backed up by several feet of tough alloy to withstand the shock of the explosions and connected to the rest of the ship only through the three feeding vents. He unscrewed the grills over the vents after much grunting and poking with his sheath knife—they had been partially fused tight. His light showed some obstruction a short distance up each pipe, which he guessed to be the lower valves, beyond which the next

charge of fuel awaited his touch on the controls.

Keith crawled out.

"No use butting my head against that solid mass of metal," he growled, "but this is going too far! I suppose everyone has to die sometime—but this is so damn *foolish!*"

He swung up to the hull and grouchy wandered forward. Presently he found himself at the port air lock. He kicked experimentally at the fused groove where the meteor had passed. No, that was not the answer.

A light moved out in the void. Another ship! Farther away this time, but Keith was glad to see it. He had had about enough. He was beginning to get scared. Let them laugh if they wanted to; he would be satisfied if someone would pull him out of this hole. He no longer cared what followed.

He ran forward and waved wildly in case anyone should have sighted his ship and continued to watch it. The other rocket drew abreast of him, some ten or fifteen miles distant.

Keith ceased his violent exertions. He switched on his flashlight and tried to signal. With pounding heart he watched for some sign that he was "hitting" the stranger. In space,



with no air to diffuse the light, no beam was visible. His only chance was to make the torch point directly at the observer so as to throw a disk of light on him, and at ten miles—

“Come on, you can do it!” he encouraged himself as he strove to steady his shaking hands. “Steady, now. Steady, there! No, that’s not it—”

The ship passed onward.

KEITH SAT upon the hull. After a time he read the dial of his oxygen tank again. Half an hour left. In the small mirror he caught a glimpse of his face. There was light enough, since he happened to be facing the distant, shrunken Sun, to see that he was likely to have a bad burn. He did not feel the warmth that Sol was capable of causing even at this range, because his suit was insulated against the passage of heat either way. The rays of the Sun had, however, played through the face plate to his skin, which was showing the effects.

He sat there with his back to the Sun for the best part of the half-hour. Occasionally he would turn to scan the void for another moving point of light that might mean a rocket ship. No more came. Space was limitless, and the others who had left for the asteroids at the same time, or immediately after he had, could have chosen hundreds of courses that would not bring them even within sight of him. Keith wondered if he were the same man who two hours ago had hoped so fervently that no one would discover his predicament. He could hardly believe he had been so blind.

For the twentieth time he rose and peered all around. Nothing. Even the two ships that had passed him had long ago vanished into the

depths of the void. Any help he needed he must supply himself.

Pacing distractedly around the ship, he paused now and then to kick at the battered port of one or the other of the air locks, but neither showed the slightest sign of loosening.

In a frenzy of desperation he flung himself down over the control room port and hammered madly upon it with his gauntleted fists. Below, the banked levers and buttons gleamed mockingly up at him. He scrambled, exhausted, to his feet and wandered dazedly about the hull. Why could not just one of the ships that had been at the spaceport pass near him? Just one. It was not fair that he should have not a single chance—

He remembered that he had had two chances, and had thrown them away through fear of ridicule. Or had he thrown them both away? He had tried to signal the second ship. Maybe they *had* seen him, and had gone on anyway. Maybe they did not think it worth while to stop for just one man. The dirty— Was it too much trouble—

He was calmed by the necessity of changing his oxygen tanks. He accomplished this without mishap, having to close the valves to his helmet and on the hoses of the tanks only a moment. The discarded tank spat out a faint halo that represented the last of the gas, vaguely visible here in space. Keith had an idea as he gazed blankly at the tank. As things stood he had only an hour.

“Only an hour,” he thought. “Only an hour to find a way, or only an hour, to wait for something. I have only an hour to live. *To—be*. And after that I—just *won’t exist*. As if I never was—”

He shook himself impatiently. Well, maybe he could manage to stretch it a few minutes longer.

Maybe he could "cheat" a little. He picked up the empty tank and started toward the stern. A further thought made him return and remove one of the outside thermometers from beside the control-room porthole.

ONCE MORE Keith swung himself across to the main rocket from the steering tube. He crawled in and inched his way along, keeping his flashlight shining ahead of him. In the vacuum, its beam did not light up any part of the tube save that directly before him. It served his purpose, however, which was to keep from cracking his helmet at the end of the tube.

He reached the end and examined the vents. The grills he had already removed, on his other expedition into the rocket. Experimentally he thrust the blade of his knife into one of them.

"Now, with a little luck," he told himself, "I ought to be able to fill a tank with oxygen—if all goes well."

He pushed the knife farther, and just then when he thought it would be too short, he succeeded in forcing the valve. He snatched back the knife as a blob of liquid plopped out. It splattered against the metal of the rocket tube, where it began to shrink gradually. The rockets were considerably warmer than the liquefied gas, since they had been receiving the rays of the distant Sun. The liquid was sucking up the metal's warmth and expanding under the lack of pressure into a gas.

Keith poked the thermometer into the diminishing puddle. The space thermometer showed -252.5 C. This, then, must be the hydrogen vent. Oxygen boiled at over -183 . The other vent was the one he wanted—

Or did he?

Keith stopped with the knife poised below the oxygen vent. He looked at the empty tank before him—at the knife—at the flashlight—

"I wonder," he muttered uncertainly. Still, these were all he had with which to gain an entrance to the ship. He might as well try as to sit out there and suffocate by degrees.

Coming to a decision, he turned to the hydrogen pipe. Having unscrewed from the tank the cap from which dangled the metal hose that fastened to his helmet, he placed the container under the vent and probed with his knife blade. He managed to get most of the drop into the tank, although some spilled. He poked again, with better results. As he became more practiced, he spilled less. He did not care to hold the knife continuously in the valve and let the hydrogen run down the blade into the tank. It would probably trickle over his glove, and although his suit was insulated so as not to conduct heat very well—still, $-252!$

Having obtained what he considered a sufficient quantity, he squirmed out of the rocket tube and pulled himself back to the side of the hull. There he set the tank in the sunlight to warm. When the contents had expanded to a gaseous state, they would be under pressure. He made sure the cap was tight.

While he waited, he took a look at his emergency tank's dial. It might be close, but he thought he had enough. He walked along the top of the hull, pausing to stare long at the top of the parachute hatch. After a while he went back for the tank.

He opened the hose valve slightly, not trusting the dial. A powerful jet of gas blew out to disperse in the emptiness of space. He closed it and carried the tank up to the hatch,

where he set it down. He laid the flashlight beside it and drew his knife—

SOME three days later a group of mechanics eyed each other puzzledly as they followed Keith across the Mars-4 Spaceport. Frequently one or the other would pause to glance back at Keith's ship and scratch his head. The original ground crew could be distinguished by the various tools they carried; but many others, pilots and off-duty ground men, had drifted over to swell the accumulating crowd.

Keith, in a lighthearted mood not at all reminiscent of his despair three days before, led them to the canteen, where he ordered drinks all around. This invitation was received with polite but somewhat restrained thanks. Keith looked around.

The semicircle of men, breathing deeply and quickly in the thin air of Mars, seemed like a pack of panting, expectant wolves.

"Well?" demanded a burly mechanic when the silence was beginning to become oppressive. He laid the oxy-acetylene torch he bore down on a table.

"Well, what?" parried Keith.

The burly one pulled out a chair very deliberately and sat down with an air of being above childish play. Another of the ground crew amplified the question.

"Look, Keith," he pleaded, "you left here six days ago—only six days—and in a ship that was in perfect order. I went over her myself. You couldn't have gone anywhere in that time. There's no place that near, except the moons and they're private property."

"You come back," a third took up the plaint, "with your ship closed so tight we have to cut our way in

to get you out. Both ports, the 'chute hatch, and even a little bit around the portholes—all banged up and dented in. From the outside! If you couldn't even get out, *what happened?*"

"Oh, that," began Keith.

"Come on, come on," demanded the chorus. "Give!"

Keith "gave."

He told about the meteor, how he had jammed the port in his haste, and of his subsequent fruitless attempts to penetrate the rocket's stubborn defenses against space. When he arrived at the point where he had carried the tank of hydrogen up to the parachute hatch, the silence in the place was as that of the tomb. Even the fat proprietor had forgotten his work and joined the audience.

"And then?" demanded the burly mechanic, as Keith paused.

"And then—well, this may seem screwy; in fact, if I hadn't been partly off my nut at the time, I probably would never have thought of it," said Keith. "I sucked in as much oxygen as I could and disconnected the oxygen tank. I switched the flashlight on and very gently cracked the bulb. It stayed lit just the same, since space is as good a vacuum as was in the bulb in the first place. When I got the glass off, I laid the flashlight on that spot on the 'chute hatch—you saw that spot?"

"You bet," nodded the husky.

"Rather hard to miss, what?" drawled one of the pilots.

"Well, on that spot. Then I opened the valves on both tanks and played the gases out of the hoses over the same place. An object at bright-red heat, or around 900 degrees centigrade, will ignite a mixture of hydrogen and oxygen. The filament of an electric bulb when lit

goes well over 2000. So the flash-light bulb ignited them and I had a fairly decent oxy-hydrogen torch."

"Ah!" The sigh rustled through the room. "Then that's what made the spot with the hole."

"THAT was it. I had an oxygen drunk on, and I didn't hold it quite steady. You know, an oxy-hydrogen flame is plenty hot—it'll reach 2500 in an inclosed space, although mine wasn't inclosed—but it doesn't give much light. I wasn't always sure just where it was hitting. Then, later, just before I had cut all the way through, I was beginning to want air pretty badly. That's why I messed the whole place up."

"But you cut through," remarked someone. "That was what counted."

"I suppose so. I lasted just long enough to make it. I burned the hole through the flap of the hatch. Then I had to yank the thing up. I reconnected the oxygen tank to my helmet, but there wasn't much in it. It helped, though, until I got a one-handed grip in the hole I had cut, and pulled the flap open."

"Those things aren't easy," said a mechanic. "They have them set to open just so fast and no faster."

"Well I know. It seemed like hours to me," laughed Keith. "I put all I had into it; I knew if I didn't get through then, I was cooked. It finally came open. I shoved back the sliding hatch, clawed at the parachute—you should have

seen me trying to repack it later!—and after about ten miles of it, I found I could get down. My head was spinning by that time. I unscrewed the manhole at the bottom with my last breath and fell through."

"Lucky you didn't pass out," said a tall pilot. "You could have suffocated right there in your own ship, with your helmet shut and the air blowing out into space."

Keith shivered.

"You're right. Fortunately, I got my helmet open just before things went completely dark. My lungs were retching for air by then. You know how you—"

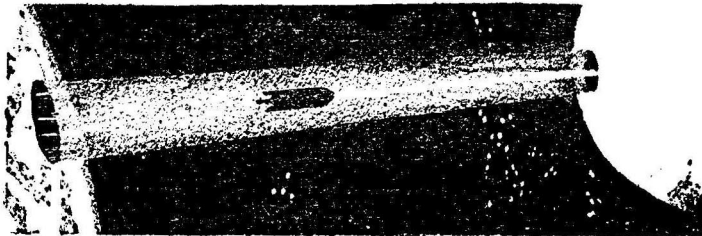
"Yeah, I know," nodded the pilot quietly. He 'id. There had been a time—

"Well, that's about all," said Keith. "I closed the manhole while I got hold of myself and broke out fresh tanks of oxygen. Then I packed the 'chute in on top of me as best I could, and swung back toward Mars. I figured I'd better have the can put back into shape before I went any farther."

"Man, were you lucky!" was the consensus.

"Was I!" agreed Keith. "At least I'm glad you can't get locked out from Mars."

"Speaking of space cans," spoke the burly mechanic, picking up his oxy-acetylene torch from the table, "here—you better carry a can opener from now on."





AND THEN THERE WAS ONE

by ROSS ROCKLYNNE

A course in enforced selfishness—

JAFEE, my "dummy" president, was boiling. He called me by radio-phone as soon as he got in from Venus.

"You can't keep this up," yelled

Jafee. "D'you want a revolution on your hands?"

"We won't have a revolution."

"I'm the guy that takes the brunt of all this," he yelled. "There's a

hundred thousand Venusians on my hands and they're screaming bloody murder. They're yelling worse than I am. They want better working conditions. They want normal Earth pressure. They want better wages. They want heat. The mines get cold!"

"I can't do anything about it," I insisted.

"They'll get you!" he hissed.

"Aw, be yourself, Jafee. Nobody even knows I own Venusian Metals. And even if they did, they couldn't prove it. You tell them if they don't like the way things are, they better ship back to Earth where they came from. And another thing. Maybe you won't like this. But another wage cut goes into effect June 1st."

He was shocked into silence. Then he broke down. "Chief," he said wearily, "I suppose you must be runnin' into financial difficulties. I suppose you have to treat these fellows the way you do to make your profit. But I'm tellin' you it's better to lose money than trample human beings the way you're doing."

"I can't help it," I snapped. "It's the way the system is run. I abide by the rules of the game."

"I guess so," he said wearily.

Before I hung up, I cautioned him once more never to mention my name in connection with Venusian Metals, and he agreed listlessly. Jafee was chicken-hearted. I couldn't be—not if I wanted to make a nice showing on my books.

THAT NIGHT I was eating alone, at the Sky Garden. Music was playing, and the Moon was shining.

I had just finished my aperitif, and was studying the menu, when a short, somewhat plump man with a scar across his clean-shaven face weaved his way round the dance floor and seated himself at my table.

"D'you mind if I sit here?"

"There's other tables," I pointed out significantly.

Then I met his eyes, and my skin chilled.

"Perhaps I shouldn't have asked you," he said in his soft voice. "Perhaps I should say that I sat here with the single intention of telling you a story."

"A story?" I managed huskily.

"Yes." He laughed genially, and, as the waiter came up, took it upon himself to wave the waiter away. The waiter went away and I said nothing.

"First," he resumed, "the story concerns six men, of whom there now remains but one. Also, it concerns a planet where you can make a jump of one hundred nineteen miles, in a straight line, and land on the same planet."

My throat was dry. I remembered Venusian Metals, which I owned. I had the impression of a cat playing with a mouse.

"This story has a moral," he went on. There was mockery behind his genial blue eyes. "A moral which I hope you have no trouble finding. Let us begin."

And he ordered himself a highball and began.

His voice flowed evenly; his voice painted pictures. As he spoke, the music, and the gayly laughing couples, and the Moon of the Sky Garden faded away. The word pictures he painted so artistically, combined with my own imagination, carried me back ten years. The story began to unfold in a secluded, richly furnished room atop the Venus Building. Men were there, big business tycoons, huddled around a table; six of them.

John March—owner of freight lines, airlines, trucking concerns—was speaking, his too-steady, slightly

distended eyes roving around to meet those of his audience.

"We could control the world market," his pompous voice rumbled. "I tell you, it's as good as done, if we get together on the idea!" He leveled a thick, rigid forefinger at each of them in turn. "Hagerstown, food distributor throughout the western hemisphere. Probably the most powerful of us all. Latham, food distributor throughout Asia, Europe, and parts of Australia. Wright, food retailer in I don't know how many countries; but he's managed to sneak his companies in so that he has a fine network across the world. Lemley, chain-store owner if there ever was one. Myself"—he tapped his swelling chest pompously—"transportation; railroad freight lines, airlines, and trucking concerns. Vane, shipper: he could keep wheat and a dozen other staple products out of Europe with his signature alone.

"What does all this lead up to? Listen!" And they listened, and they watched, March's own enthusiasm striking fire to their own; filling their minds with plans; unfolding a picture that was worth looking at!

They saw March's immense, ringed hands trace the picture of a narrow-necked bottle. The lower part of the bottle, said March significantly, represented the food supply; represented the farmers, and the billions of acres of food-producing land.

"Seal off the neck of the bottle!" said March, his distended eyes glowing. "How do you get the stuff inside out? How?"

"You don't," said March. He hunched forward, whispering. "Gentlemen, we are the neck of that bottle! The outlet! The food distributors, the retailers, the transporters. Need I go on?"

Hagerstown, the food distributor

of the Western Hemisphere, coughed delicately. He was a thin, emaciated sort of man. "It sounds foolproof," he admitted cautiously. "Then the idea is to broaden our holdings, squeeze out the independents—"

"—and jack up prices," the chain-store owner Lemley put in, snapping his thin fingers. "It's a cinch, if there ever was one!"

Latham—the food distributor—drummed an expensive eversharp on the glassed-over table, his expressionless, slightly ironic face turned toward Hagerstown. "Yes," he agreed, "it's a sound idea. I, for one, make no objections. But it means that we have to strengthen our own forces by combining." He smiled with a trace of derision. "We'll keep it secret. And in order to protect ourselves—I don't think any of us would mind sticking knives in the others' backs—we'll sign certain agreements. Count me in, March."

"Me, too," said Lemley.

Vane and Wright added their votes, and lastly, in accordance with his overcautious principles, Hagerstown came in.

There was wine, and it made a pleasantly gurgling sound as it was poured.

March stood up, rocking back and forth on his heels, a pleased, proud expression on his heavy face.

"Gentlemen, to the food monopoly!"

Six glasses clinked, and the toast was drunk.

They spent a few minutes justifying themselves.

"What's dirty about it?" said Lemley. "It's the system we live under, understand? It's dog eat dog! Now, fellows, it looks to me like the first step lays with Vane. We'll starve England—gently, of course." He went on talking, and Andreas Vane listened, at times in-

terspersing florid, genial comments, his whole body shaking as he laughed.

They discussed, these six men, and the more they discussed it, the more plausible and honest it became. They glowed with their own enthusiasm. What couldn't be done with the food monopoly? Food ruled man!

During a momentary silence came an interruption.

The walls, which, as is the common belief, have ears, broke loose from their age-old silence and spoke.

"A COMMENDABLE plan," said the walls. "Will you remain motionless, while I decide which of you is the filthiest?"

And they remained motionless, for the voice of the walls held a threat that congealed their blood and stiffened their muscles so that they quickly became statues acquiring a green patina.

The calm, derisive voice of the walls said: "You first, Derek Lemley. I think very little of you. You've done so many dirty things I can't begin to remember them all. You've treated the human race like the devil. Your chain stores are a sore on the planet. Most of your products are stamped with the seal of approval of the Housewives Food Purity League—a seal of high value in the minds of all people, including yourself; since it is your own, concealed, self-operated invention.

"Andreas Vane," said the voice of the walls, without a second's hesitation, "your name is appropriate. You are proud and vain and fat, and eternally boasting your selfmade-ness; rose from the gutter; devoted every minute to getting ahead. As I recall it, you used to curse the capitalist for holding you down; now you're a capitalist and holding others down—

"Hagerstown, you are unspeakable. A cautious, timid soul of a man, you like to stick daggers in your opponents' backs. Thus you have won out; by making sure there was no opposition; that nothing could strike out at you.

"March, John March. A man as men go, though there are unhealthy blue lines under his eyes, and his overfed stomach is beginning to protrude. A rascally scoundrel, who has taken by brute force, beaten his opponents down with one thought: to rise above them and secure the power he needs to feed his vast ego.

"Robert Latham, I confess that I like you, at times. You see yourself for what you are. You can sneer at yourself. You can see through the petty artifices of others. Thus, you are tolerant, though impatiently so. You can be strong at times, but your own self-condemnation weakens you. But this does not excuse you from your just deserts. You are greedy, you are a trampler. You used to have a splendid body, but excesses are beginning to decay it. So much for you.

"Henry Wright, your hypocrisy is too obvious! Studying your face now, I would feel a burst of doubt if I did not know you well. You look much younger than your thirty-nine years; perhaps in your early twenties; just a young, inexperienced little man, caught in the net set by five others, eh? Is that what your china-blue eyes and your innocent expression is supposed to mean? I'm sorry. Try your hypocrisy on others; it will work, as it has in the past.

"That completes the roll."

The Voice was silent.

March's thick lips set.

"Who are you?" he said, without moving.

"It doesn't matter."

"How d'you know so much about us?"

"Made it my business. I supposed that some day I'd have to judge you."

March's temper was beginning to rise.

"You judge us!" he snarled. "I'll teach you to judge!" His chair clattered back. He came to his feet, angry red lights flickering in his eyes. He started toward the wall closet, for it was there his realistic mind knew the intruder was. He started—and that was all. Something touched his sleeve, lightly. He looked down. The sleeve of his coat was singed, badly, and one side of the cuff was gone.

Nobody had seen from which direction the flash had come.

March stood frozen.

Lemley's thin lips moved. "Better show your good sense," he muttered.

Breathing heavily, March slowly returned, picked up his chair, and sat down.

The Voice said mockingly, "Resistance is useless, I assure you.

"I have, as you may guess, a little plan. The question is, I think, whether any of you is fitted to survive. You may remember the law of survival of the fittest? It has gone quite to pot since the Industrial Revolution. Perhaps it can be revived for a short time. I wonder which of you is most fitted for survival.

"And, not only do I wonder, but

I am going to make the experiment. It should be enjoyable. A game. Something to amuse me. To avenge the world at the same time. Yes, it shall be done. Please remain motionless."

And there was a flash of light before their eyes.

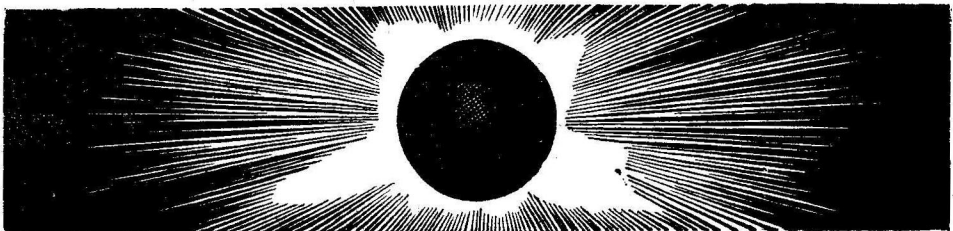
Andreas Vane cowered back from it, knew it for what it was, in his last moment of consciousness. An anæsthetic bomb. A sickening odor that could take all semblance of life from a man's body. Andreas Vane was a quick thinker, in spite of his smugness. He tried to hold his breath. No use. He had the momentary gratification of knowing that the others had been caught, too. Everything was dark, then.

VAGUELY, after that, he felt the rumbling vibration of a ship cutting through the emptiness. His hardening arteries almost burst with outraged pride. He almost woke. But again came the sickening odor.

The next time he awoke, he struggled out of his torpid state without hindrance. He came to full consciousness cautiously. Quiet, all around; and though he strained his ears, he heard nothing. His eyes were still closed; he felt his muscles balling, his nerves beginning to stretch.

He forced himself to remain calm, and did.

He opened his eyes and saw light. Light? It was so dim that it was just about two shades above dark-



ness. It was a pale-violet in color, ghostly, and came from the sides and below. He made the astounding discovery that he was standing—which was not astounding at that, since he felt, instinctively, that there was no gravity. He wriggled his corpulent fingers and discovered they were incased in gloves. Gloves of a pliable, thin material; the kind they used with spacesuits. Nonconductors. That one fact gave Andreas Vane part of the picture, and his pendulous lips began to tremble. He clamped them determinedly.

He was quite evidently clad in a spacesuit, and breathing air from a tank, and being kept warm with electric coils. He moved his arms, discovered the niche in the side of his suit from which these operations were controlled. Besides them there were other buttons and tiny, finger-sized switches.

His flesh crawled. "The experiment begins," he said to himself huskily.

Gingerly, he tried to raise one foot. He failed. He stooped over, and looked at his feet. His shoes—if shoes they could be called—were large, massive, metallic. The surface they were resting on was metallic. His shoes, quite evidently, were magnetic, and were the only thing that held him in one spot.

The light, he saw, came from no one direction. It simply emanated. He decided that the metallic surface—for it was that—was fluorescent, or something akin to that. The surface itself was wavy, had no projections, no rubble, and stretched away to all sides until he failed to see it any more.

The peculiar thing was that he seemed to be at the bottom of a huge bowl, for the metallic land stretched away and lost itself to his

eyes at a distance which must have been five or ten miles at least.

He discovered, suddenly, that he could move, by sliding his magnetic shoes across the metallic surface. Moreover, he found a switch which regulated the current flowing into the shoes. He essayed a few steps.

"Must be an asteroid," he muttered. His bushy eyebrows drew down in a frown. In the half light, he made more discoveries. One was that strapped around his waist, hanging from his right side, was a plain scabbard; in the scabbard was a sword. Vane drew it halfway, shuddering. It was a long, slim, horrible-looking weapon; it fluoresced in the violet light, a slim needle of death.

His jowls quivered. "Ugh!" With repulsion, he started to throw it away; but suddenly remembered the Voice, and thus retained his grip. He returned the weapon to its scabbard, shivering. Where were Hagerstown, Lemley, March, Wright, and Latham? Near here, somewhere?

Other articles he found were: a powerful flashlight, a food kit, swung across his back; a pair of powerful binoculars, and—an ordinary, old-fashioned six-shooter in a holster on his left hip.

Lastly, he discovered that his helmet was equipped with a radio sending and receiving outfit. He expelled his breath in relief. This was more like it!

Every operation was controlled by switches and buttons set into the niche at the hip of his suit. With an eager, jerky motion, he snapped the headset on.

He wet his lips. Then, "Halloo! Halloo! March! Lemley! You, Hagerstown! Halloo, there!"

His flaccid lips were beginning to set disappointedly when a carrier wave abruptly sounded. A voice—

the Voice, Vane knew it was—spoke.

"Very good, Vane! You have collected your wits more swiftly than the others. I would advise you, incidentally, to retain all your equipment. Particularly—if I may suggest it—your sword."

The Voice would not speak again, no matter how pleadingly Vane addressed, nor how badly he lost his considerable temper.

He shouted and yelled, but only succeeded in deafening himself. His lips curled bitterly and he was silent. He looked at his right hip resentfully, and shivered.

Why did he need the sword?

HE WALKED around for a while, his sweating face strained. Then he stopped, and devoted himself to getting in touch with his associates. He kept his receiver on constantly, until he had the good sense to conserve power. Thereafter, he turned it on at intervals of two minutes.

March came in on a flood of invective, and Vane, wincing, shut off the receiver for a few seconds until the tirade stopped. During that time, Hagerstown came in, frightened, bewildered, pleading.

Lemley's voice, thin, irritated, snapped back at him, "Oh, for God's sake, shut up! Who all's on the line?"

"Latham and Wright are missing, so far," Vane said. "They'll come in. Where are you?"

"Don't be silly!" snarled March. "Where're *you*?"

Hagerstown's thin, frightened voice started to speak, but Latham, coming in with a burst, drowned him out; and Wright's soft, resentful voice came after his. For a while, Vane's helmet was a madhouse, with five different, metallic voices blasting away at the same time.

"Damnation!" he bawled angrily, thus getting into it himself. But it remained for March's bull voice to shock the others into silence.

"Shut up!" he roared. "Who's got any ideas? Shut up! You, Hagerstown!"

Hagerstown, the food distributor, said in a strained voice: "I'm not certain. The gravity's so weak, we must be on an asteroid."

"What d'you mean—weak?" Wright said. "There isn't any at all."

"Where're the stars?" Lemley demanded of Hagerstown, witheringly.

Latham spoke up, his well-bred voice faintly amused. "Outside, of course. The whole thing's too obvious. Our friend dropped us into a hole in the ground."

March growled reluctantly, "I guess Latham has got it right. By the way." He tried to keep the gruff note in his voice, but failed. "Who else has a—sword?"

Apparently, everybody, not only had a sword, but a Colt revolver, binoculars, flashlight, and food kit, in addition to the regular appurtenances of a spacesuit.

"Something," said Lemley cheerfully, "is very, very screwy."

"We've been kidnaped," March rumbled dangerously.

Wright smirked, "That's news."

Hagerstown's teeth made a rattling sound. "It . . . it's a plot. Some rival concern, out after our interests."

"It's that damned . . . that damned Voice," said March tensely, a raw note of fury creeping into his tone. "I'm going to see personally, that he gets what's coming to him, the bloated, egotistic—"

"*S-sh!*" Hagerstown's voice blasted out in a scared whisper. "How d'you know he's not listening

to us? No sense aggravating the man! Treat him softly!"

"To hell with that!" Lemley snapped contemptuously. "Treat him the way he deserves. If you—"

"How about listening to me for a second?" Vane bit out angrily. "Of course the Voice is listening to us. He spoke to me," Vane said self-importantly. He added significantly. "He told me to be sure and keep my sword."

March explosively started to speak, and suddenly subsided, in shock. There was a strained silence. "Wh-what's the reason for that?" Hagerstown stammered. "Swords? Dangerous beasts down here?"

"Dangerous beasts? Yes, indeed! They are called: March, Vane, Lemley, Hagerstown, Wright, and Latham!

"Each of you will need his sword and his revolver and his wits to protect himself against the other beasts. Do you understand?"

"WHO said that?" March broke the silence.

"I didn't," said Vane. His nerves were thrumming, and the palms of his hands were more clammy than was ordinary.

Other denials floated in like ghostly whispers.

"It was the Voice," whispered Wright. "I guess he's having his little joke." He laughed hollowly.

Lemley made an irritated sound. "All right, Voice," he snapped. "What d'you mean? What's the joke, then? What fool trick you trying to pull on us?"

"No joke and no trick, I assure you," said the Voice amusedly. "You may consider yourselves beasts in an arena, each fighting the others to the death. A free for all, you know. Each trying to win out over the

others. And one—and only one—winning out.

"Each," said the Voice, mockingly, "trying to corner the food supply."

March's breath broke loose. "You're talking out of your head."

"I am telling you that one of you beasts will, at the end of—five weeks, shall we say?—yes, at the end of five weeks, one will remain alive. Simply because he possesses the food monopoly. What is so wrong with that? There is no food on this world, save what you now possess yourselves, in your food kits. Why is that different than cornering the food supply on another world, the Earth?

"It is the same, of course," the Voice went on smoothly. "Each of you has enough food in his kit to last him three days; and water enough for three days. By being charitable, I would suggest that each of you can live, on what he now has, about five days. But what if one man should manage to get *all* the food available? The food and water that the others have? I should think he could keep himself alive for five weeks at least." The Voice hovered liltingly. "It all works out very cleverly, you see."

"You're seriously contemplating this?" said Latham, in a voice that had turned to steel.

"I'm not contemplating it. *You* are. I simply set myself up as a judge, lay down the rules, and reward the winner with what I conceive to be a just reward—freedom. He who lusts most for survival will, I believe, be the lucky man."

"What if we decide not to play the game?" That was March, snarling.

The Voice was almost sorrowful. "I think," it said, "that you will."

"I won't!" Hagerstown quivered. "I'd never enter into anything like

that. March! Latham! Vane! Y-you wouldn't I know!"

"Why," said the Voice, "did you omit Lemley and Wright?"

There was a moment of shocked silence. Hagerstown whispered, in a voice that made Vane's scalp tingle, "You wouldn't—would you, Lemley?"

Lemley chuckled. "Pick your own hearse, lanky!"

"Shut up, Lemley!" March roared furiously. "And you, Hagerstown, don't be such a sniveler. That's Lemley's idea of a joke."

"Ha-ha!" said Lemley in faintly disgusted tones.

"Of course," resumed the Voice, still mockingly, "it may come about—by a very long chance indeed—that you'll all band together and refuse to treat each other as beasts of the arena. In which case, of course, you'll all starve together."

Wright said plaintively, in his young voice, "I don't see what I've done to merit this. It's unfair. Besides," he hesitated, "even if we wanted to get together, we couldn't. There isn't any way to locate each other."

THE VOICE chuckled. "Sure you just want to get together, Wright? Maybe— Well, let that go. About locating each other, it's very simple. Each of you, perhaps you've noticed, has a different carrier wave tone. You'll doubtless learn which carrier wave belongs to which person. By rotating the loop antenna atop your helmets so that the carrier wave you want comes in at its strongest—that is, by taking the minimum—you'll be able to locate the person you want to locate. In order to find out which direction the tone is coming from, you'll find four collapsible iron grids which, when expanded, will cut off radio waves from any direction

you choose. By a process of elimination, then, locating one another is quite simple; be he friend or—victim."

"Victim!" gasped Hagerstown rackingly. "You . . . you fiend! You expect us to hunt each other out, to kill each other, for the mere purpose of continuing to live? We won't, you understand? I know what we'll do," said Hagerstown, with a sudden burst of inspiration. "We'll band together. We can hear your carrier wave, too. We'll hunt you out, and butcher you the way you want us to butcher each other."

"No, Hagerstown," said the Voice, with pity. "I think that nothing like that will happen. For, you see, I am outside the planet, you are inside. And there is no way out—for you. Come, come!" the Voice said coaxingly. "Don't you see there's no alternative? Give yourselves up to this game, for the longer you delay, the less becomes the food supply, and, therefore, the greater the demand. If you delay too long, it is likely you'll be forced to resort to—cannibalism."

"My God!" said Hagerstown, and sounded as if he was going all to pieces.

"Ugh!" said Lemley. "I've heard that no matter how you fix human steaks, they still turn your stomach."

"Your sense of humor is cutting," snapped Latham in disgust. "Listen you, whoever you are, I have no intention—at the present time, anyway—of killing anybody. . . But you forgot ammunition belts for these out-of-date Colts."

"The guns are loaded," said the Voice. "That will be sufficient. There are a few other points I will have to mention. One of them is that you can jump."

"Jump?" said Vane, the shipper. "Wherever you want to. Perhaps



"I can," said the Voice, "operate through walls. You'll come with me and learn—"

you've suspected that the arena in question is a hollow planet, quite perfectly hollow, too. A few feet more than one hundred nineteen miles, I believe. You see?"

"Ye gods, no!" Vane said in exasperation. "How could we jump anywhere we wanted to? We'd simply fall back."

"Of course you would—if there were any gravity to pull you down. But there isn't any in a hollow planet. You can, therefore, jump clear across the diameter, one hundred nineteen miles, and you'll land at exactly the speed you take off. I advise you, by the way, to land on your feet; and the second you land, you activate the electromagnet in your shoes. The interior of the planet is entirely metallic.

"A few other points: The planet has a rotational period of twenty-five hours plus. All six of you are on the equatorial line, spaced evenly. The line-up is as follows: Latham, Lemley, March, Wright, Vane, Hagerstown. The planet rotates in that direction; from Latham to Lemley, and so on.

"I think," mused the Voice, "that that is all. Now, I need only to watch. Good hunting, my friends. And, rest assured, I'll return in five weeks. Good-by!"

"Wait a minute!" Hagerstown screamed piercingly.

But the Voice was gone, and its carrier wave with it.

"DO SOMETHING, you fools!" shrieked the food distributor. "Can't you see what this means?"

"Shut up, Hagerstown!" said Latham, in a cold voice.

There was a long, uncomfortable silence.

Latham spoke again, coldly. "There has to be some kind of organization here. I would advise each

of you to take the minimum on everybody else, and try to keep everybody's location in mind. Then, if anybody starts roaming, we'll gang up on him."

Lemley snickered. "You forget we can't keep our waves on all the time. Fact is, if we were smart, we'd shut them off whenever possible. We have to conserve power."

"Shut up for a minute and give us a chance to get your location," said Wright sullenly. "I'm not taking any chances."

"You don't have to be afraid of me," babbled Hagerstown. "I'm telling you right now I'm not—"

"You make me sick!" March shot out. "Why can't you be as sensible as Vane, or some of the rest of us."

Vane laughed deprecatingly. "I'm not exactly composed, but I am rather keeping a grip on myself, at that. Well, I suggest we all get together in a group. That way, we'll know what the others are doing."

"When will we sleep?" inquired Lemley.

"When will we sleep?" Hagerstown took up the refrain, his voice going tremolo. "How will we know the ones who are awake won't be plotting the murder of those who are asleep? I tell you, I can't stand it! I'm going to sit right here and defend myself!"

"Oh, oh," said Wright. "There it starts."

"What starts?" That was Latham.

Wright was smirking. "Aristotle or some other Greek said that when a social group got above six they'd start breaking up into little cliques. What chance have we got when our sociable little group starts breaking up?"

"Who's breaking away except Hagerstown?" said March fiercely.

"You think I'm going to trust myself to a pack of wolves? No, *thank*

you. I'll stay here, and wait for you guys to bump yourselves off."

"That goes for me, too," said Lemley, who seemed, in his own callous way, to be enjoying the situation. "Leave your radios on, fellows. I'd like to know which one goes first."

"And who does the job, of course," smirked Wright.

The silence was clammy. Vane found himself breathing abnormally fast. When he spoke, his voice was hoarse.

"You, March, Latham, myself—we'll get together, and talk this over."

"All right," said Latham, his voice hard as steel.

March agreed, and without paying any attention to the three others, they talked the matter over. It was quite easy to believe that the merest jump would carry them from side to side of the planet, traveling at any angle. Latham suddenly remembered that Newton had once dealt with the theoretical problem; had proved that at all points on the interior of a hollow planet, the forces of gravitation canceled out. So if this planet was theoretically perfect in its hollowness—that is, practically homogenous, and with practically equal diameters in all directions—then the thing would work.

Talking it out, they discovered it would not do to meet at the center of the planet. They'd miss each other, inevitably, since inequalities on the surface would cause them to deviate from the vertical; and since their velocities, arising entirely from the speed with which they jumped, would certainly not be uniform.

"We'll meet at a point where one of us happens to be, then," decided Latham. "Agreeable? All right. As I see it, all six of us are on the interior equator. The order runs: myself, Lemley, March, Wright,

Vane, Hagerstown. We're spaced equally."

"Which gives us the same chance, like runners at the start of a race," said Vane gloomily. "The two cliques are mixed together, too. Notice that?"

"By Heaven," snarled March, "if I ever get out of this—"

Latham heaved a sigh of resignation. "Keep cool, March. Vane, I guess you're our destination. The three of us form a triangle, the two legs equal in length. March and I are at the ends of the base line. So if March and I take the jump, we'll land at about the same time."

"The point is," said March, "how fast can a man jump?"

"Look at it this way. We don't have to overcome gravity, only our own inertia. We can assume it takes a high jumper about a second to jump six feet. The acceleration rate on Earth is thirty-two feet, isn't it? That is, at the end of a second, a freely falling body is falling at that speed. Then our athlete not only jumps six feet, but jumps fast enough to overcome that thirty-two feet. Although none of us are athletes—far from it—we ought to be able to make around thirty-four, or thirty-six feet. True? Get set, then, March. Watch your chronometer, and we'll figure our actual speed later on. Get set, go!"

LATHAM FLEXED his powerful legs, and shot himself up from the hard, unyielding surface of the planet at an angle determined by Vane's carrier wave.

"The record for the high jump," he thought cynically.

He had his head turned toward the blackness above him. He noted now that somehow he had acquired a rotation, for he slowly turned until he saw the fluorescent surface be-

neath. It was like nothing so much as a huge bowl, with the sides steepening in an even curve. As he moved outward, at a speed he could not guess with any exactness yet, the rim of the bowl continued to extend outward, but grew fainter in the process. Within fifteen minutes, he could see only the faintest gleam of lavender luminescence. Another five minutes took even that. Then, to all intents and purposes, he was suspended in a void of absolute blackness. He could, of course, feel no motion, since his speed was constant.

He got in touch with March, exchanged a few comments, and then told Vane to turn his carrier wave on after an hour or so, and switch it back in after that every five minutes or so.

"When we land," Latham explained, "we'll turn our sets on, and then you'll catch our wave. That way we'll find each other without wasting power."

"Hurry it up," said Vane dispirit- edly. "This is the first time in years I haven't had somebody around to keep me company. Don't be surprised if you find a raving lunatic. I've got plenty of time to brood about my past sins."

His guffaw almost split Latham's eardrums. He turned off his receiver in disgust. Vane, in Latham's opinion, was an egotistical fool, though at times he seemed to have a level head. The Voice—damnation, what could you call the fellow?—had had Vane down to a T. And for that matter, he'd also had friend Latham down to a T.

Latham scowled to himself. There was something unbearably senseless about this whole thing. They were all fools, everyone of them. Planning some way out of this mess. Good God, couldn't they see there wasn't any way out?

Even Lemley, Hagerstown, and Wright were fools. Going to sit and wait until the others killed each other off, were they? Why didn't they get up and *do* something?

Latham's gloved hand dropped to the hilt of his sword. His lips twisted in grim humor. "Why," he asked himself, "don't I do something?" He pulled out the sword, for amusement slashing it back and forth. It was an *épée*, no good for slashing, but an excellent weapon for piercing a man's body.

Suddenly, a thought came to him, and he turned on his receiver. He received two carrier tones. Whose were they? He was about to use his transmitter, when one went off. But he spoke anyway. The tone sounded like Vane's.

"That you, Vane?" he said sharply.

"Huh? No, this's me." Lemley's voice was unexpectedly genial. "I just had my picker-upper on to see if I couldn't snatch up a bit of conversation. This is the damndest place. Ghostly. You know what I mean?"

"It's worse out here," said Latham. "Dark."

"I guess so. I feel all washed out. Tired. Notice nobody else's got their receivers open. Maybe"—a harsh laugh crept into his voice—"maybe they're out visiting."

"Maybe," said Latham cryptically. He was about to sign off without another word when he thought to himself, "Why do that? Lemley isn't so bad, though he's got the moral sense of a turtle." To Lemley he said, "I'll get in touch with you again."

"O. K.," Lemley said, yawning.

By the chronometer above Latham's eyes, he timed his trip across as something more than four

and a half hours. During that time, he got hungry and thirsty. Without thinking about it, he swung his food kit around, drew out the water tube, and sucked water—just one mouthful. Then he stopped, frowning.

"Five days," he mused to himself. For the first time the real situation hit him. He let the water tube roll back into the food kit. "I'm not hungry, after all," he mused, and frowned.

The first suggestion of light came, and grew in intensity, until the violet-tinged "bowl" took shape. He was rotating, now. He didn't feel like landing on his head, particularly at this velocity. At the last moment he managed to twist around so that his body was parallel to the surface. Thus he struck on his hands and feet. He had already switched current into his shoes, and thus was held fast with no danger of a rebound. He stood up, and reflecting that he had not been able to contact Vane once in the hours he had been floating, switched on his headset. Three carrier waves came in. One belonged to Wright, another to March, another to Lemley. Both Hagerstown and Vane were missing.

Wright, the food distributor, was suspicious. "You and March are too damned near, Latham. I'm warning you to keep away. I'm not being ganged up on by anybody."

"Where's Vane?" rumbled March. "I couldn't contact him on the way down."

"How long have you been down?" demanded Latham.

"Well, it took me about four hours and twenty minutes."

"I managed it in twenty minutes more than that. You've been here longer than I have. Are you *certain* you haven't heard Vane—or seen him?" Latham's voice was ugly.

"I said I didn't!" March blazed.

"Keep your insinuations to yourself. I'll try again."

But Vane's carrier wave did not show up.

A grim smile played around Latham's hard lips. Was Vane the type that would hunt up another man with malice aforethought? Else, why would his carrier wave be off? Or was he—dead? Either dead or roaming, that was certain.

March and Latham finally agreed to work their ways toward each other. Latham pulled up one of the collapsible screens on his helmet, discovered it cut off part of March's waves, thus knew that March was in that direction. March's wave strengthened as he moved.

Coincidentally, Wright's also loudened.

"I'm warning you!" Wright shot out. "If you fellows try to hem me in, I'll jump, straight up!"

"Oh," Latham said, carelessly, "don't forget we've got six-shooters." He smiled.

"You're threatening me!" Wright panted. "You hear that, Lemley? You hear that? If my wave is suddenly cut off, you'll know who did it."

The chain-store owner yawned. "That," he said, "would be a shame."

"You needn't be such a fool," growled March.

Latham said patiently, "What I'm wondering is how we happened to land so near Wright, March. Didn't we start out for Vane?"

"It's a screwy set-up," Lemley yawned.

March suddenly came out of the gloom, and as he saw Latham rushed toward him, in a pure gesture of relief. Latham's lips hardened, and he stepped back, and pulled his six-shooter from his waist. He was a capable shot.

"One step nearer, March," he said coldly, "and you get it in the belly."

March gaped. His hands flew up and clasped his helmeted head. He groaned. "My God, Latham. You're crazy; we're all crazy! You thought *I* was coming after *you*? I was relieved, that's all—relieved!" He seemed unable to comprehend it.

Latham remained cold. "Perhaps it was a gesture of friendship. I really wouldn't know. At any rate, I'd suggest that neither of us make any sudden motions."

March agreed limply, still shaking his head. "Well, here we are," he said wearily. "So what?"

"Let's see if our sacred line-up is preserved."

Lemley, for some reason, had switched off. Latham made repeated calls before he came in again. Hagerstown answered, then Wright.

Vane was missing.

THE ORDER was somewhat mixed up due to March's and Latham's movements, but the three others were in their correct places. That meant then, that instead of landing in what might have been termed Vane's sector, March and Latham had landed in Wright's.

Latham thought about this for a while, and then thought of something which began to bring some sort of order out of the chaos. His capable jaw set, and he made a motion to March to switch off his radio entirely; Latham did the same, and then beckoned March. But March was suspicious and made vigorous denials. Impatiently, Latham put his arms above his head. March nodded energetically and did the same, and then approached. Latham maneuvered until their helmets were touching.

"Can you hear me?"

AST—5

"Just about," March nodded in surprise.

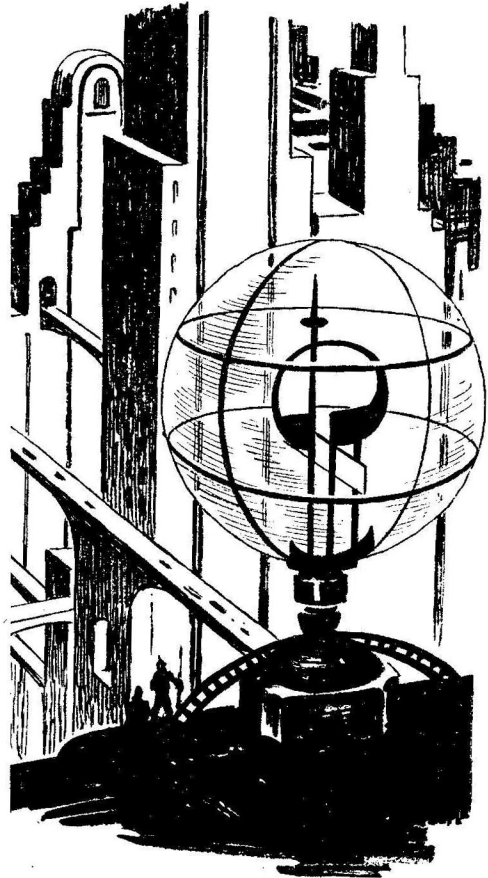
"The sound is carried through the helmets. Now listen. Did you ever stop to think that our Nemesis told us this planet was rotating?"

The railroad magnate frowned. "Y-yes."

"While we were floating across the planet toward Vane, the planet was carrying Vane away from us, and putting Wright in his place. So that's where we landed."

March jerked his head up and stared at Latham. "Good God!"

Latham smiled twistedly. "Now what if there was a master mind among us who thought of that before we did? And put it to some



use and got Vane out of the way, afterward figuring out where he *should* be, and jumping there?"

"How do you know Vane's out of the way?" March's voice was shaken.

"Well," Latham conceded, "he might be jumping around at that, with his own plan in his head. In that case, all of us are still alive, aren't we?" His lips twisted again. His gray eyes lidded. "You know," he suggested, "it'd be much better if Vane was dead."

March nodded, his eyes staring. "I know," he said huskily. "The food supply would begin to localize."

For a moment they drew their heads back and stared at each other with a series of new thoughts in their eyes.

"I'm hungry now," the railroad magnate said bluntly. "But I'm afraid to eat. Haven't got the nerve."

"Of course. But if Vane's dead, there's one man at least who's got ten-days' food supply. If he's not too sick to eat." He added slowly, "Maybe we better find out who killed Vane—or if he is dead."

"How?"

"We'll go where Vane should be," said Latham.

He stooped over and with the sharp metal tips of his gloves drew a circle on the metallic surface of the planet, and marked six dots, spaced equally, on the rim of the circle. He studied it for a moment. Then he straightened up.

"While we were crossing the planet," he mused, "the planet rotated one sixth. Wright's position moved where Vane's was. Vane's moved where Hagerstown's was. Hagerstown's where mine used to be. Mine where Lemley's was. Lemley's where yours used to be. So by setting our course toward where Hagers-

town is *now*, we'll land where Vane *will* be."

March nodded doubtfully.

Latham found Hagerstown's carrier wave, and by careful rotation of his antenna, and setting of his screens, found the exact course.

"Hard business, this," muttered March. "Jumping at an angle."

They set themselves, swayed to the correct angle, cut the circuit to their shoes, and pushed themselves out.

LATHAM WATCHED his chronometer, and when four hours was up, placed his binoculars to his eyes, and waited for the first sign of light. In a few minutes, it came. Latham swept the binoculars over the territory he could see. The land below was a huge bowl, fluorescing, and was, on the whole, smooth. Latham suspected he should see Vane, if the man were anywhere in that area.

March, who had one arm hooked through Latham's, sighted Vane first. Or at least they supposed it was Vane.

"He's standing up," said March. "I guess he's alive."

"Why should he fall down?"

They landed safely, perhaps a mile from the figure, and started immediately in that direction, and finally reached the standing figure, which proved to be that of Andreas Vane, after all.

And he was truly dead, a sword having evidently been plunged through his spacesuit, into his back. There was a jagged gash in the suit where the air had rushed out. Vane had died mostly from the sword thrust, but partly from asphyxiation. His face was purple, and his swollen, bloody tongue was protruding from his mouth. His food kit was empty, both of water and of food.

"I couldn't have done it," said

March, staring at Vane without repugnance.

"Of course not," Latham conceded. He did not bother to make a denial himself. He stood swaying on his magnetic shoes, thinking:

March looked at him queerly. "I think Hagerstown did it."

Latham raised his eyebrows.

March went on, still looking at Latham significantly. "All Hagerstown had to do was to know that the planet rotated—or to remember it, rather. He remembered that and made his plans accordingly. Also, Vane's sector was right next to Hagerstown's, and was rotating toward Hagerstown's. All Hagerstown had to do was to jump at a very low angle, just skim the surface of the planet and land where Vane was. Then find him."

"Vane would have fought back," mused Latham. "No, maybe he wouldn't. Nobody'd suspect Hagerstown of that."

"A cornered rat will fight harder than a free one."

"What do we do? I'd suggest we go after Hagerstown. The man's got a mind!" Latham exclaimed, in a burst of wonder. "He must have jumped all the way back to where he was supposed to be. By the time we had landed and found each other, he had plenty of time to jump back."

March's thick lips set, and his gloved hand fell to his sword. His lips formed five words. "Let's go and get him."

Latham smiled quizzically. "To get even with him? To punish him? Or to get his food supply?"

"What does it matter?"

"This is leading up to one thing," said Latham.

"What?"

"Eventually, unless we have the good sense to separate, one of us is going to murder the other."

THEY FOUND Hagerstown by the same process they had used on Vane. They came up on him from two directions. Hagerstown was standing upright, swaying slightly, his magnetic shoes holding him firm to the planet. March and Latham came up behind him, their headsets off. March threw Latham one fierce look, and then drew his sword, and was about to plunge it into Hagerstown's back, when Latham grasped his arm.

Latham's cynical lips formed the words, "Maybe he didn't do it, after all. He's asleep."

March's heavy face wrinkled as if he hadn't heard aright. With a half-angry motion he turned on his headset, and gestured to Latham. Latham shrugged and turned his set on.

"You're crazy!" March rasped. "Didn't we decide Hagerstown was guilty?"

"Lemley and Wright can hear us talking," suggested Latham.

"To hell with 'em! Didn't we?"

"I'm not sure now. Look." Again Latham drew a circle on the metal surface. "Lemley could have done it."

March said in a rage, "Lemley couldn't have done it! We were talking to him while we crossed."

"We were tumbling around in empty space. We couldn't have known where Lemley was. He could have jumped across to where he knew Vane would be. He could have murdered him, and then jumped back to where he was supposed to be. By the time he got back, the planet would have rotated two sixths."

March's shoulders sagged, and a pallor came to his face. "Then we don't know about anybody. By the same, token, Wright could have done it!" His face was wild.

Latham studied him, his hard eyes half lifted. "You think we're not

getting any place. Only one man gone."

March looked at Hagerstown's unprotected back and pointed. His finger was trembling. "What's the difference?" his lips said.

Latham nodded. "What is the difference?" he said, quizzically. Then, "Have you ever killed a man?"

March panted, "Certainly I did. Once."

"That tells me a lot. You don't mind making the confession, which means that you believe none of us—except one—will remain alive. If it's you, there's nobody to snitch. If it isn't you, it doesn't matter anyway."

"I never did believe that more than one would escape."

"But subconsciously you did. Now you don't. Which makes it a certainty. You're willing to murder Hagerstown."

March's eyes were bloodshot, and he was crouching like a beast. "Certainly I am," he snarled. "Why waste time? Why not get it over with?"

"By the same token, you're willing to murder me." Latham felt a peculiar boiling in his stomach. He had never been sick inside a space-suit. He clenched his fists and did the only thing that seemed sensible. Bent his legs as far down as they would go, snapped off the current in his shoes and jumped.

And left March with his victim.

Latham still felt sick, but it was half in loathing of himself. He closed his eyes and knew he was trembling.

He was on his way an hour before he caught anybody's wave.

He listened to the babbling, horrified voice with an incredulity that turned to hysteria. His stomach began to heave, and he knew he was

laughing. His own laughter was a hell inside his helmet. Tears began to run down his cheeks, and he doubled up in midspace, and felt as if he was being torn across the stomach, torn clear in two.

"I'm crazy," he thought to himself. "And I thought I was strong. I'm a weakling. But God, I can't stop."

But he did stop, eventually, gasping. Exhausted, he felt every muscle in his body relax; he drifted, trembling, and determinedly set his lips, forcing himself to breathe evenly, to think logically.

After perhaps ten minutes, he said weakly, "Hagerstown."

Hagerstown spoke cautiously. "Is something wrong? You sounded as if you'd lost your mind."

"You," said Latham, and laughed again. He caught himself. "It's *you* that's wrong. You shouldn't be alive. March should have killed you. Did he—or didn't he?"

"That's what I started to tell you when you took the fit." Hagerstown's own voice had a suggestion of hysteria. "I must have been sleeping, but I woke up and turned around and he was coming at me with his sword. God! There was only one thing I could do. I shot him. He's dead." The food buyer's voice quavered. "If this keeps up, I'll go crazy," he said hoarsely.

"Where are you now?"

"Here. Where I've always been! Wasn't that the agreement?"

"I didn't know there was any agreement," said Latham wearily. He managed to think cynically again. "You took his food, of course."

"Somebody else besides March is dead," Hagerstown whispered.

"Sure. Vane. How did you know?" Latham snapped.

"There were two food rations in March's kit."



The corpse didn't fall for lack of gravity, but stood there with blind eyes watching the theft of its food—

Latham groaned, and shut his eyes, his nerves beginning to ball up. *March. March. March!*

"Hagerstown," he said, "protect yourself. With three food rations, you're a worthy prize for anybody. Perhaps you'd better discontinue your pacific activities and do some scouting around yourself. I still don't see how March could have had time to do it." He groaned again.

"Nobody has his carrier wave on," Hagerstown protested in fright.

"They could have had their receiver on." Latham sighed. "Go to your own hell, Hagerstown. I'm on the way to mine." And he cut connections.

FOR A long time Latham drifted in a state of semicoma. Then the familiar sight of land brought him back to full consciousness. From force of habit, he took out his binoculars, and scanned the territory. No one down there—yet. As he approached the surface, of course, the surface rotated away under him. He kept the binoculars to his eyes, and suddenly stiffened. There were two figures down there. Only one was moving. Suddenly it stopped. Latham craned his eyes, but saw only that that figure had a gun in its hand. He heard nothing, but saw one of the figures drop. Without the waste of a second, the killer worked over the body swiftly, then stood upright. Suddenly it jumped, at an angle. Frantically, Latham trained the binoculars on it—but sight was lost in the darkness.

He knew one thing only: one of the figures had been Wright, the other Lemley. A process of elimination would reveal the murderer. And Latham felt that he would have no qualms about killing a man who deliberately, and with aforesight, killed another person.

He landed awkwardly, and with some force, but struggled to his feet, and slid across the surface in the peculiar manner necessitated by magnetic shoes.

He dropped to one knee, and trained his flashlight on the face of the murdered man. The sightless eyes of Wright stared up at him. A bullet had evidently got him in the back, and death had come from a combination of asphyxia and bleeding. There was blood caked around Wright's mouth, frozen into crystals.

Lemley, then, had been the murderer. Latham came to his feet and stared up into the darkness.

He thought vaguely, "I must have the desire to kill. Anybody at all. But I haven't got the guts to kill without provocation. Lemley murdered Wright. Thus I have the provocation. I make myself believe I'm avenging Wright—when Wright wasn't worth avenging."

"No. I want Lemley's food supply. That will give me three rations and Hagerstown three rations. And Hagerstown's a cinch!"

His lips twisted again, and he stood there, waiting for Lemley's carrier wave.

It came in presently. "Anybody home?" said Lemley. "I'm picking up somebody. Have you committed murder yet, friend? I've heard it's the newest fad."

"Don't be funny," said Latham, coldly. "What are you doing?"

"Eating," said Lemley cheerfully. Smacking sounds came over the receiver. "But concentrates aren't very satisfying."

"Whose concentrates—yours or Wright's?"

Latham's receiver was silent for a full ten seconds. Lemley laughed harshly.

"My own," he snapped; then he laughed more agreeably. "So I mur-

dered Wright, did I, Latham? How many are left, by the way?"

"Myself, you, Hagerstown."

"How do you know I murdered Wright, Latham?" Lemley's voice was mocking. "Maybe it was Hagerstown."

"I saw you."

"Hm-m-m. Well, what's the difference? Whether I did, or you did, or Hagerstown did. It all comes out the same in the end. And even if I did murder 'im, what about it?"

Latham frowned and hesitated. Lemley wouldn't confess anything if the finger of God was on him. "Stay where you are," he growled. "I'll see what Hagerstown has to say."

Lemley snickered again. "Why bother about Hagerstown? O. K., O. K., I'll be here waiting." A sucking sound came from the receiver. "That's my own water," Lemley informed Latham, and broke connections.

BUT LATHAM already had his location. He set himself at the correct angle, and jumped; and once he was beyond the light, he knew a sense of desolation and aloneness; as if the juice of life had been pumped out of him, leaving his bones dry. Futility was in his mind. The utter uselessness of everything. If he could only drift like this, forever, just the bare glimmer of thought to keep him alive—like an amoeba.

He would have to kill Lemley. And then, as a matter of course, Hagerstown.

Again he was using his binoculars. And saw Lemley, standing upright, with his own binoculars up to his eyes, staring into blackness. He was looking directly at Latham.

"Damnation!" Latham said with a sudden wildness. He drew his six-gun with a trembling hand and

trained it downward. With the other hand, he turned on his headset.

Hagerstown's and Lemley's waves came through.

"Fine," said Lemley. "Here we are, all together. Have you committed your little murder yet, Hagerstown?"

"I had to," mumbled the food buyer in a broken voice. "It was either March or me."

"My, my"—Lemley clicked his tongue—"what an innocent little man. In a short while, Hagerstown, there will be only two—unless Latham has only thoughts of peace on his mind. Care to land and talk this over, Latham? After that, we can murder each other at our leisure."

"Your gun is drawn," said Latham coldly.

"So's yours."

"I prefer to keep mine handy."

"So do I. Go ahead and land, though."

Latham managed to stabilize himself, and for once floated down feet-first. He switched current into his shoes, hit with a jar, and stuck, swaying.

Lemley was not more than fifty feet distant, the metal parts of his suit reflecting the faint violet light. They eyed each other without speaking for several seconds.

"Why don't you shoot?" said Latham coldly.

"It happens that I'm not a murderer at heart. Why accuse me of Wright's murder? Why not Hagerstown?"

"Don't be absurd, Lemley." Latham's eyes narrowed, and his legs forked to take care of the gun's recoil. "Hagerstown couldn't possibly have arrived where Wright was before I did. Because I definitely left him behind."

"Well—so naturally, if Wright

was left dead," Lemley mused, "then the murder was pinned on me." He was lost in thought. Latham saw him nod his head in confirmation of his thoughts. "Yes, Latham, I think I see how it was done now. Hagerstown is your man. Go peddle your peanuts somewhere else. After you finish off Hagerstown, come back here and we'll talk—"

"My God!" babbled Hagerstown. "You talk as if I'm just a pawn in a game. You, Lemley, accuse me of a murder you did yourself! I warn you," he panted, "if either of you comes near me, I'll fight! I'll shoot you like I shot March, and I mean it!" His breath came rackingly.

"Good act," said Lemley, offhand. "What about it, Latham? You want to go across and get—*damn* you!"

Latham's gloved finger released the trigger, and a hard smile stretched his lips as he saw Lemley stagger, and heard curses coming through his receiver. Lemley's face was wild with fury. Latham pulled the trigger again, disappointedly saw that he'd missed. Lemley didn't seem to be dying either.

Something exploded in his brain. A flare of brilliancy mushroomed up. He knew, with a shock of horror, that he was screaming, screaming unendingly. The brilliancy died. He caught a glimpse of a pale-violet world, with Lemley outlined against it. He was still screaming, but not so piercingly now. The pale-violet became paler, approached darkness, became darkness absolute. His screams stopped. He knew, with a burst of utter grief, that he was dying.

Lemley stood over him, his thin face set in a scowl. "Damn fool," he said, his voice cracking. "Damn fool!"

He stooped and extracted food

and water from Latham's kit, and placed the supplies in his own.

He hadn't yet made a good start toward the food monopoly, for now—all told—he had the food supply of only two persons: himself and Latham.

HAGERSTOWN must have cut connections in the excitement, and though Lemley listened for an hour his wave did not come through.

"Huh!" he grunted sourly. "Damned if I'll let him come and get me. I'll go hunting myself."

He only had a slight idea where Hagerstown was. He should be somewhere near where he had been originally. That was two sixths of the circumference of the planet away, in a direction opposite to the planet's rotation. Lemley took a guess and jumped at an angle, his guess being based on the position of Latham's dead body. Latham's head, as Lemley remembered it, had been lying "across the equator." The ears, therefore, pointed out the equatorial plane.

He didn't trouble to time himself, and was surprised when the first glimpse of light came through. Unhurriedly, he placed his binoculars to his eyes, and for the first time—since he had actually stayed in his place, and had done no jumping—he saw the effect caused by the gradual diminution of light. He scanned the huge bowl of light, and was disappointed when he saw no sign of Hagerstown.

"Better luck next time," he thought. "Hell! How do you get down in one piece!" His eyes popped as he saw the surface rushing up at him. He threw his arms back, and his feet came down. At the last minute, he remembered to bend his knees.

Lemley hit, and felt as if he was

breaking himself off at the ankles. He had forgotten to send current through his shoes, and when he got his bearings again he discovered, in dismay, that he had bounced up from the surface of the planet, and was slowly—very slowly—drifting away. He squirmed around vainly, trying to throw himself back the mere two or three feet between him and a solid surface. He continued to move upward at a slow, steady rate—perhaps no more than a foot a second.

He ground out a curse of exasperation, and regarded the receding surface in perplexity. He frowned.

"O. K.," he said slowly. He blithely switched on his headset.

"Hagerstown," he snapped. No answer. He tried again and again, over a period of five minutes. His calculating eyes sparkled. He swore audibly, and ended with a groan of pain; not too loud, not too soft, but exactly the right note.

Then he snapped off his headset, and waited, as he slowly drifted upward, so slowly that after two hours the huge bowl was still plainly visible.

At the end of three hours, he was using his binoculars, anxiously. What he was waiting for came abruptly. A tiny speck, just large enough to be discerned, suddenly showed up where the rim of the bowl faded out into blackness. It was moving, silhouetted against the violet light. Lemley's breath broke loose, and exultantly, he waited until Hagerstown—for it was he—landed. Then he pulled the Colt, lined himself up, and fired.

The recoil sent him into tremendous velocity, and started him tumbling head over heels. He deliberately stiffened himself at full length, and by thrashing about with legs and arms stabilized himself

again, with only a slight rotation. The bowl was approaching swiftly, and the dot that was Hagerstown was growing in size. Lemley held the gun in front of him, his lips drawn back over his teeth.

"Here's where you get yours!"

Closer, closer. Hagerstown was standing with his hands on his hips. Evidently he had thought to find a badly wounded man. Lemley was almost on top of him when Hagerstown looked up. A look of wild alarm crossed his face.

Lemley pulled the trigger.

"You're dead!" he yelled with the full power of his lungs. "You're dead! Fall down, damn you!"

Hagerstown did not fall down. His lips were open in a snarl of pure hatred and fright. He pulled his gun and blasted away at Lemley. He crouched, and shot no less than three times. Lemley wildly shot again. He was hanging then without motion, but this second shot sent him spinning back again, away from the surface.

Wildly, he pulled the trigger once more, aiming as best he might. He yelled furiously when he saw that Hagerstown was still standing; though naturally, he remembered, he couldn't fall.

Then he couldn't fire any more. Partly because of the distance, mostly because he had only two bullets left, and he knew he'd need them to cut his velocity down.

His arm dropped, and in abject disappointment, he watched Hagerstown recede. The man was still standing. But—his arms suddenly dropped to his side, and his knees buckled. Lemley excitedly put the binoculars to his eyes, but all he could see was Hagerstown as a small receding dot. Lemley could not know if he was dead.

He must have crossed the planet

in less than an hour. When land showed up, he fired at the land, twice. His formerly furious speed was cut to a slow drift. But within twenty minutes he had landed.

His gun was empty, but, nevertheless, his brow furrowed, he figured where Hagerstown should be; and so jumped. His angle was only slightly off, but he had to walk for two miles.

Hagerstown was dead, standing up, blood frozen around his nostrils.

In his food kit were the food rations of four people, all told: his own, Vane's March's, and Wright's.

"What a shame!" said Lemley, mockingly. "The prime devil of us all. So March murdered Vane? Not at all, although it might have been possible. You murdered Vane and told Latham that March had had two rations in his kit. You also murdered Wright, and must have used at least six bullets in order to get there before Latham, who thought you were me. But *I* murdered *you*. So laugh that off, cry baby!"

So, since Lemley had cornered the food supply successfully, his was a soft life for five weeks—within limits. On the food and water question he had to discipline himself rigorously. "It's only a habit, anyway," he told himself philosophically.

For amusement he jumped, using five dead bodies as his landmarks. He became so proficient in this art that once he made a perfect bull's-eye and landed square on March's spacesuited chest—from a point clear on the opposite side of the planet.

Once—although ammunition was limited—he made a flight across a diameter of the planet in a little more than thirty minutes. It cost him ten bullets.

He lost count of time, but knew, by the amount of food and water remaining, the approximate number of days that passed.

The last of his food went. One day later, he was forced to drink the last of his water.

He waited ten hours, his nerves tensed. Finally he snapped on his headset. "Voice," he snapped, "the famine's on. The population is about to die out."

The hands of the chronometer had gone around once more, and Lemley's tongue was beginning to swell, when a carrier wave sounded, and the Voice spoke, amusedly.

"The famine's over, Lemley." It spoke no more, though Lemley swore thickly. Lemley stayed awake until he couldn't hold his eyes open; and then slept.

When he awoke, he was in a little cell, lying on a bed, wearing his ordi-

ROMEOS



TRADE

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MARK

nary suit. He jumped to his feet, stood looking around him, cautiously. Before him was a table, not heavily laden, but with enough to feed him twice over. He ate—and drank—and when he had finished, sat down on the bed and started to demand explanations.

He never got them. There was a puff of light, and a sickening odor assailed his nostrils.

"Oh, damn," he thought, and lost consciousness.

THE PLUMP MAN with the scarred face stopped for the first time since he had begun the story. He gestured to a waiter who had been impatiently staring at our table. He ordered a drink and raised his colorless eyebrows at me.

"I don't feel like drinking," I said, although my throat was dry. "I'm not hungry either," I said at the waiter. The waiter went away.

I forced my eyes back to those of the plump man.

"Go on."

"That's really all of the story. Lemley won out. Perhaps he should have. The debonair shall inherit the Earth."

"I thought it was 'The meek shall inherit the Earth.'"

"Some Biblical students claim that was the result of a bad translation. I prefer 'debonair.' At any rate, the word conveniently applies to Lemley. One of his characteristics is that he seldom took anything seriously. He was easygoing."

There was a hardness behind his genial blue eyes. "I'll say this much for Lemley. He woke up on Earth, after his strange experience, and did some serious thinking. The result of that was that he broke his chain stores up into a hundred small companies and sold them to individual buyers. He's had nothing to do with

food since—in a commercial way, of course. He's fairly respected in some quarters now. I might say he's a new edition of himself—though the pages are becoming somewhat tattered again."

"Where'd you get the story?"

"Does it really matter?" He stared at me intently, his eyes acquiring a certain paleness. Before I knew what he was doing, he was on his feet, still staring at me.

"But I think you know the moral."

And then he was gone.

Slowly the soft music and laughing couples of the Sky Garden reached my mind again. I paid my check and left, and went to a private phone booth.

Jafee's voice answered presently. "Oh, you, chief." He seemed disgusted.

"I want you," I told him, "to draw up a report of the various complaints made by the employees of Venusian Metals."

"What good will that do?" he said sarcastically.

"Plenty. I've recently had a change of heart. Sure, voluntary. And there won't be a wage cut. I might actually manage an increase, instead."

"For Heaven's sake," Jafee said in an awed tone.

"Change the letterheads and envelopes. Take your name off. Put mine on. Since I've decided to change my ways, I might as well come out in the open.

"D. Lemley, president—D. Lemley— Hell, does it sound that bad?" He had been choking.

"Scuse me, chief," he said apologetically. I could almost hear him scratching his head. Finally he admitted, "It's just that I can't understand what got into you, all of a sudden."

MARTIAN QUEST

There's more than one way to kill a cat—but sometimes drowning it in cream is smart! Particularly when the "cat" is as tough as the Martian Khom.

By Leigh Brackett

HE disembarked at Thern, heart of the Rikatva Area, a pale, stooped shadow of a man, young from his face, but old and hopeless from his eyes. With him nearly five hundred other passengers on the ancient spacetub climbed down into the dry red earth that was their last hope of economic freedom.

Rikatva and Tchava, the Martian Reclaimed Areas. The Tri-Council—great minds of three worlds—had poured money into them in an effort to give the unwanted overflow of a crowded civilization a chance to get off the public charity rolls. Water, brought in tanker ships from wetter worlds; Venusian humus, acid phosphate, nitrate nitrogen, to make the alkaline desert fruitful; after that, crude shacks and cruder implements, scrimped together with what was left from the funds wrung so hardly from resentful taxpayers.

It was common talk throughout the Solar System that the Areas were a failure. Only the destitute still had hope.

The young man breathed the thin air and shivered. When special guards herded the mob across the landing field to the supply houses, he followed with the quiet obedience of a well-broken beast.

He presented his papers at last to the Assistant Commissioner, a lean, saturnine Martian from over Tchava way.

"Martin Drake," read the Commissioner. "Single. Occupation, secretary." He scrawled his name as though sick of seeing it and grunted, "Secretary! And not a farmer in the lot of 'em, I'll wager! All right, Martin Drake; you're out on the edge of the settlement, with the other single men. Makes less fuss when we lose 'em."

And while Martin Drake was pondering that remark, the long line pushed him on, down to tables where guards rummaged in the scanty luggage of the newcomers.

Drake submitted his for inspection. "Any firearms?" demanded the guard, and patted him expertly. Drake shook his head.

The man next ahead of him in line had an automatic taken from him, and commented, "Still remembering last year's outbreak, eh? Made you work for your keep, then, didn't they?"

"I wouldn't be too smart," the guard retorted. "If the guys that have to foot the bill for this outlay keep on howling, and you yellowbellies don't make a better showing on the credit side, we'll still have



The flame-bombs stopped the incredible toughness of the thing only momentarily.

army pay, and you'll be right back on the streets!"

The line shoved Drake on and on. Eventually he found himself in the one street of Thern, clutching his allotment of tools, seeds, and clothing, and the halter of a vaard; an ugly, hairless Martian edition of the horse, with harness-galls and a waiting malice in its little yellow eyes. And

there was something about Thern, unscreened now by sheds and hangars, that made the lost, old look deepen on Drake's face.

Huddled and squalid under the huge loom of the water tanks, the cheerlessness of Thern was horrible; here and there rose the shattered marble spires of the ancient city, mute prophets of futility.

Drake sighed and drew out his land card.

THE words meant nothing to him. He looked about for a source of information, and was abruptly conscious of a clamor arising down the street. People began to pour out of the bars and happy joints in a drab, morbidly curious crowd, and the red dust of the unpaved way rose in a choking cloud.

Only one man stayed behind, a tall Venusian, his boots spread wide apart, his cloud-colored eyes narrowed as he watched the crowd mill and turn back upon itself. A sun-browned man of slow, massive strength, with something of the Earth's hard honesty in the set of his big-boned head and curling yellow-beard. Drake became painfully aware of his white skin and undeveloped body. But he had to find his home. He gripped his land card and tapped the tall stranger hesitantly on the shoulder.

The cloud-colored gaze flicked half contemptuously over the Earthman's stooped thinness. "Well?"

Drake showed his card. "Can you tell me—"

The tall man cut him short with an unenthusiastic grunt. "Your land is next to mine. I'm going home now. Come if you like." He gestured to a two-wheeled cart with a vaard between the shafts. "Get in, and tie your beast behind."

Drake bent over the cart tail, fumbling clumsily with the halter end. The vaard jerked its head perversely, and the knot would not make. He heard the Venusian's derisive grunt, and went scarlet. Then slim brown hands reached over his, and a clear voice spoke in his ear.

"May I help?"

Drake looked up. A girl stood beside him, a slender, smiling angel

in patched overalls, crowned with a tangle of black curls that danced in the breeze. She was glowing and strong and confident, and Drake stood in awe before her. She took the rein from his hand, tying it deftly while he stared and could not take his eyes away.

He was still staring when she looked up to ask his name. Drake stammered it out, drinking her in as though she were something he had never dreamed existed, and wanted never to forget. He saw her flush, and never thought of rudeness. Dimly he knew that the crowd was swirling back toward them, but her voice came clearly.

"I'm Terra Brooke. My father has the farm next to Tels'."

Terra. Earth. No other name would have fitted her. Just looking at her roused a strange new joy in Drake, something that sang for no reason except that he *was* looking at her.

The shock of Tels' great hand on his shoulder was like a physical pain. "Have you never seen a woman?" demanded the Venusian shortly, spinning him round.

Drake gasped out "No!" just as the edge of the crowd curled round them. Terra's brown face paled, and she turned her head away.

"Let's go, Tels," she pleaded, climbing into the cart. "I don't want to see."

Tels didn't hear her. Harsh-faced, he tightened his grip on Drake's shoulder, thrust him bodily through the crush, to where men carried a blanket-covered thing on a stretcher.

"Look there, Earthpuppy! That's what's driving us from the land. That's what you city-bred weaklings can't fight. But Khom doesn't care. He gives no quarter to weaklings. Go on. Look!"

He ripped the blanket savagely from the huddle on the stretcher. Drake retched and held down a writhing stomach. The man beneath was dead. Naked to the waist, the manner of his dying was horribly plain. Something had struck him in the side, crushed his ribs and snapped his spine and laid his entrails bare.

Something had done that with one blow.

"Khom?" faltered Drake. Martian for Destroyer. "But what . . . what is it?"

Tels' strange burst of savagery had burned out with the sight of death. He muttered, "The great desert lizard," and turned to his cart. Drake stumbled after him, white and shaken.

The road they followed out of Thern ran between dusty fields, set to beans and alfalfa and yellow Martian grapes. Here and there the land was stripped bare of green things, as though a plague of giant locusts had descended. Irrigation ditches, a stink of fertilizer, furrows cut square across the wind, weathered shacks without a shrub or a shade tree, and ahead, the open desert. Drake looked out across the flat emptiness of it, and heard for the first time the low laughter of its drifting earth under the hand of a wind that never stopped.

"Ugly, isn't it?" said Terra Brooke's low voice. "But it's all we have."

"It's better than nothing at all," said Drake with a queer, cold bitterness. "Anything is better than that!"

Tels studied him in his slow way. "Your clothes are good," he said finally, "and your thinness is not from starvation. I think you don't know what 'nothing at all' can mean."

Drake flushed. "I didn't mean —" He broke off, staring. "Look at that vineyard!"

The others looked, startled; then they turned questioningly to Drake.

"What about the vineyard?" growled Tels, and Terra added, more kindly, "It's only one that Khom has stripped."

"Yes," said Drake excitedly, "but look at the vines! They're eaten right down to the ground."

Tels stared at him. "Of course. So is the desert scrub he eats. So is everything he touches. What of it?"

"But how strange for a lizard to eat wood!"

"Perhaps," said Tels. "But he eats it, Earthman, and everything else beside."

"I suppose," added Terra gently, "it's because there's so little food in the desert; only the scrub and the cactus. Khom needs a lot of food, and I guess he's learned to use all there is. He even gets his water from the cactus, you know."

Drake nodded; for the first time his face was animated. "Odd, isn't it? Adaptability—"

"All that interests me," Tels interrupted, "is dinner. And even that I hate. Beans! When my melon ripens, I'll have something sour to cut the rotten dust from my throat!"

DRAKE had dinner at Tels' shack that night. Terra wanted it. She explained that she often cooked Tels' supper when he was late in town. Khom the Destroyer had stripped their vineyards not long before, and her father was not well, so any company Terra had, she had at Tels' place. Tels came for Drake, to show him the way, and before they left Drake's shack, the Venusian faced him.

"For Terra's sake you are wel-

come," he said, his eyes embarrassingly steady on the Earthman's thin face. "But look you, stranger." The curling blond beard was thrust rockily forward. "I will marry Terra when my farm is settled. And she is no street wench, to be stared at. You come for dinner, that is all!"

Drake's face flushed angry scarlet, but Tels' broad back was turned. They went in silence to the neighboring farm.

Terra was an expert cook. The strong desert hen was like pheasant, the baked red cactus and mixed beans from the fields fit for a potentate, for all Tels' grumbling. Drake's dinner went down in a dream; a dream filled with a black-haired angel rattling dishes on an ancient stove.

The overalls had been replaced by a simple print dress, and the sweet slim lines of her made Drake's throat ache. He was a confusion of unfamiliar feelings. He flushed and choked and stammered, and wished himself a hundred miles away, and yet nothing would have made him go.

Terra talked to him a good deal, about the Areas; Tchava, she said, was no better off than Rikatva, and the whispers of a sudden stoppage of funds grew steadily louder. The lizards were worse than any Biblical scourge, killing without mercy when disturbed at their feeding. Khom was the greatest enemy; dust storms and dryness and grudging fertility could be whipped in time, but Khom was the harvester of the crops.

Terra smiled suddenly at Drake. "Never been on your own before, have you?"

"No," Drake admitted humbly. "My uncle raised me."

Tels snorted. "You picked a fine place to come to," he growled. "Dust

and wind and barrenness." He rose abruptly, thudding his fist with savage gentleness against the wall. "On Venus," he said softly, "there is dark earth that doesn't blow, and rain. Rain!"

Terra laid a sympathetic hand on his shoulder. "It is a hard place, Martin. And since the trouble last year, they won't let us have guns."

Drake remembered the man in the supply shed. "What happened?"

"Some of the settlers here got tired of fighting. There are barbarian tribes in the desert; they live by plunder. North of us are the radium mines. The settlers sent the barbarians against Rikatva to keep the soldiers busy, and went and attacked the radium mines. There was fighting, and a lot of men died before it was over. So all guns are forbidden here."

"But the lizards! Haven't you any protection?"

Tels shrugged. "Guns are not much use against Khom. Only his eye and his throat are vulnerable, and since he feeds only at night, it's hard to hit them. We all keep flares; the light sometimes drives him off. So far he has let me alone."

Changing the subject abruptly, he said, "Here, you, Earthman; see what I have raised."

There was a box full of black earth in the warmest corner by the stove. Drake saw that the conditions were as much like Venus' sultry dampness as anyone could make on Mars. He studied the pallid melon vine with its two long fruits, and said:

"Wouldn't it have been better to grow it in a culture?"

Tels glared. "A culture!" he snorted, and held out his hands. "Not while I have these to dig in the earth!"

Terra's eyes were suddenly shining. "First the lizards, now growth-cultures. Are you a scientist?"

Drake's thin face showed sudden lines. "No," he said dully. "No, I'm not a scientist. I'm a—secretary."

Terra studied him. "Show me your hands, Martin Drake."

Puzzled, he held them out. Then, abruptly realizing, he snatched them back, thrust them deep in his pockets. Terra smiled and shook her head slowly.

"Stains, and acid burns. You're no secretary; you're a chemist."

Drake was shaking, and his eyes were hollow. "I thought I was, once," he muttered. "Now I'm just a farmer, out on the edge of things where Khom can get me without making a fuss!"

"Why did you lie?" demanded Tels.

Terra, tense with some strange urgency, rushed on uncaring.

"Martin, I think a scientist could save the Reclaimed Areas! We can't do it ourselves, and the Tri-Council can't afford to send experts out here to work, perhaps for months and months. But you're one of us, Martin. You could try!"

"Try—what?"

"To destroy Khom! Guns and poison won't do it, but science could find some way, I know it!" She caught the Earthman's bony shoulders impulsively. "Will you do it?"

And while Drake stared at her, trembling, while Tels' harsh laughter rocked the room, there came from outside a horrible hoarse screaming; a rasping shriek of fear that set the hair prickling down their necks.

Tels swore a furious oath and sprang for the door, catching a flare from a shelf as he ran. Terra's brown face paled, and she said one word: "*Khom!*"

THE FROSTY air bit into Drake as he followed them outside. Both moons were up, throwing crazy shifting patterns on the fields. Tels was leaping for the vineyard, shouting terrible things in his own tongue. Drake made out several blots of darkness, eight or ten, that had independent movement. They were among the grapes, and the neat rows of vines were broken now like crumbling battlements.

Tels threw the flare. A lurid glare burst over the vineyard, and Drake saw Khom, disturbed at his feeding.

Wicked triangular heads shot up from the ruined vines, horny reptilian heads framed in ruffs like Triceratops. Bodies two feet longer than a tall man raised high in ominous preparation on strong clawed legs, and tails—

Drake shivered, remembering the dead man on the stretcher, torn in two with one blow. Khom had a tail as long as his body and his head together; a mighty, supple flail armed with rows of deadly spikes.

Tels was still running toward the invaders, mad with the rage that takes a man when he sees the work of his hands destroyed. The vaard in the stable screamed on monotonously, terrified by the rank scent of the lizards. Tels stopped suddenly, began throwing clods of earth, shaking with a bitter, dreadful wrath.

Terra yelled a frantic warning. Eight of the lizards turned abruptly from the glaring light of the flare, running swiftly, high on their legs like monstrous crocodiles. But one, larger than the rest, stayed behind to do battle.

A clod burst squarely between its eyes. Opening wide a gaping mouth set with strange rodential teeth, Khom charged.

Tels turned to run, twisting fran-

tically aside from the sweep of the wicked tail. But Khom was swift. The spiked bludgeon swung, struck viciously. Tels, a hoarse scream of agony stifled in his throat, was tumbled limply aside into his broken vines.

Drake had a momentary glimpse of a back armor-plated like a battle cruiser, and huge jaws agape with silent laughter. Then Khom had shot by them, out into the dark, whispering desert.

TELS was still breathing. Straining, panting, Drake and Terra carried him back to the shack. The girl was white, dry-eyed. Unhesitatingly she stripped the blood-sodden shirt from the Venusian; drew a long, shuddering breath.

"Right arm and shoulder broken," she whispered; "and I think some ribs. Poor Tels, to be so foolish!" Her fingers bit into Drake's soft muscles. "Get the doctor, Martin. The hospital is the big white house in Thern. Ride Tels' vaard. And hurry!"

Drake hurried. But the one thought in his mind was: "She loves Tels. Terra loves Tels."

Later that night he sat with Terra beside the Venusian's cot. The doctor had set the broken bones, molded a great clumsy cast around Tels' upper body. "He'll live," he said, and left.

Terra placed her hand on Drake's. "You see now why you must try to destroy the lizards?"

Drake spread his hands. "Why not men with flame guns, or atomic bombs?"

"It would take years, and there's no money."

"Poison, then."

Terra shook her head. "Khom eats no flesh, drinks no water. We

can't poison our crops. No, Martin"—her eyes caught his, held them—"only science has a chance. It's up to you!"

There was a sudden sound from the cot; a feeble ghost of Tels' booming laughter. The Venusian had awakened.

"You ask too much, Terra," he whispered. "You ask a little weakling to lift the land on his shoulders."

Drake rose, flushing. Terra said quietly:

"What are you afraid of, Martin Drake?"

Again the husky laughter. "He's afraid of death, girl! He's afraid of work and pain and hunger, but most of all he's afraid of death. I saw his face when he looked at the dead man in Thern!"

Drake stood like a stooped, tant thing of marble, head averted, while Terra shook her dark curls and answered.

"No, Tels. You're wrong. It's life Martin Drake's afraid of!"

Drake swung suddenly to face them, his thin hands clenched until the bones gleamed white.

"You can judge me, you people!" he burst out at them. "You weren't born owing your life, food, clothing and the schooling you had, to someone else. My uncle took me; I had nothing when my parents died. I've never had anything. Since I was old enough to talk, I've been paying my uncle back what I owed him.

"He had me taught chemistry, not because I liked it, but because he thought I'd be the most use to him in the laboratories. George Breckner, of Interworld Enterprises, who hated his sister because she defied him to marry my father. My father, you see, was a failure, a visionary scientist who died a pauper. Uncle

George had little hope for me, but he made me work! I took orders and cleaned test tubes and mixed solutions, but I never worked as an independent chemist. I wasn't worth it. I was my father's son, and dependent on my uncle for my bed and my dinner.

"It's easy for you to be strong and independent! You weren't taught from babyhood that you were utterly worthless and incompetent, existing on charity. There did come a day when I had my doubts. I thought I had stumbled on something in the laboratory. I thought I could prove to my uncle that I was worthy of consideration as an individual. I thought . . . I thought I could prove it to myself."

His voice faltered. He pressed his palms to his throbbing temples, and his words were almost inaudible when he went on.

"I made my experiment; secretly, because I wanted it to be a surprise, something no one could ignore. Well, I succeeded!

"I destroyed five thousand dollars worth of equipment in the resulting explosion. How I escaped death, I don't know; I wish I hadn't. But I had made a stupid, foolish mistake; if it hadn't been after hours, I might have killed every man in the laboratory. I knew then that my uncle was right. I . . . I ran away—"

Terra put her hands gently on his trembling shoulders. "You can help us here, Martin. I believe in you."

Martin Drake met her eyes. "You don't understand, Terra," he said simply. "I can't help anyone. I haven't it in me."

He turned and went out, walking slowly across the ravaged fields where the stumps of the grapevines were gnawed clear to the earth, and behind him there was silence in the cabin.

NEXT MORNING every house in the Reclaimed Areas found a printed proclamation at its door.

Due to the high cost involved and the untenability of the land, it has become impossible for the Tri-Council to continue to finance the Reclaimed Areas in their present state.

Wishing to give the Areas every possible chance, the Tri-Council has arranged a public hearing on the fourth of November, two Martian weeks from today. If, at this time, reasonable proof can be shown that the Areas may be placed on a sounder basis, the Tri-Council will take the matter under advisement.

However, all residents are requested to hold themselves in readiness for immediate abandonment of Rikatva and Tchava.

Drake was sitting on his bunk, the crumpled paper at his feet, when Terra Brooke came in. She came without knocking; standing there, her black curls disheveled, her eyes strained and tired in her white face, she seemed dazed and queerly uncertain.

Drake stared at her blindly. "There's nothing left now," he said tonelessly. "I've got to go back to my uncle. There's no place else where they'd take me. He . . . he said I'd come back."

Terra's hands made an aimless gesture. Her lips moved, but whatever words were back of them died in her throat.

"Why did you come?" asked Drake.

"I . . . I don't know. Perhaps I thought—" She broke suddenly, covering her face with her hands. Drake could see the tears shining between her fingers.

"—I thought you might still save us, Martin Drake," she said, very low. "But you couldn't. Maybe Tels was right. Maybe you are a weakling!" Her eyes were suddenly shining fiercely into his.

"What about Tels? He has to go back too, to a stinking swamp that swallowed his land on Venus. What about the hundreds of people who hoped to live here; the thousands more who might have found new life here? They have to go back, to the charity rolls. What about my father and . . . and me, Martin Drake?"

Somehow Drake found himself on his feet and repeated, "Why did you come?"

"Because—" The fierce tenseness went suddenly out of Terra's body. Her head dropped; Drake strained for her whispered, "I don't know—"

There was nothing sane, nothing ordered. In the last day and night he had lived a hundred years. He had lost all identity with himself, all sense of the ordered pattern of things. He tilted Terra's tear-streaked face up and looked into her eyes. It wasn't a conscious act; some strange, hungry yearning, something beyond anything he had ever in his narrow existence known before, took his body and moved it.

He took Terra Brooke in his arms and kissed her.

For a long moment she lay quivering against him. Abruptly, like a wild thing, she wrenched away and struck him, hard, across the face. Then she was gone, running like a deer across the naked fields.

Drake stood still, his fingers against his bruised cheek. "I don't know," he whispered. "I don't know! But what difference can it make? I've failed anyway! Two Martian weeks. That's ten Earth days. Ten days!"

EIGHT of those precious days went by in a hopeless search for some point of attack. There seemed no

way to begin; Khom didn't offer himself to be studied, there were no research laboratories, no fellow scientists to help. Then, on the eighth night, Khom made a raid across Drake's land into the inner circle of farms, and the furious, hate-filled settlers drove him back with flares, pursuing him right to the edge of the desert. Drake, caught in the forefront of that tide of battle, had barely time to turn his vaard loose to escape by itself, and then run for the comparative safety of Tels' shack. From there, he saw three men die under Khom's tail, and saw his own shack go up in flames from a random flare.

Poking morbidly through the ashes in the morning, choking over a vile stench that rose and went streaming out to the desert on the steady wind, he found something. Holding his breath, he knelt and pawed the ashes away with his hands.

Charred, head and tail partially burned away, but body still intact, a young Khom lay in the ruins. Only eight feet long, but old enough to have musk glands that sent up a stench, along with the charred flesh, that could have been smelled in Tehava.

Drake gasped for air, but he didn't leave. Here was a chance to study the enemy first hand. The armor plate had preserved the important parts of the carcass. He had no instruments, no facilities, but it was just possible—

He shook his head. This was the ninth day. Still—

He dragged the brute clear of the ashes, borrowed a tarpaulin and a sharp knife from Tels, and began his bloody task.

It was a sickening job, cutting and slicing and handling things that were

never meant to be seen. The tarpaulin kept the sun off, and Drake stayed on the windward side, but all day that musky reek went trailing out into the desert, seeped clingingly into his clothing.

And, at last, he sat back on his heels and whistled. "So that's how he gets away with his wood! An extra stomach, supplied with an enzyme culture—just like a termite. Protozoans, of course, to digest the cellulose for him. One-celled animals, living in an alkaline culture; got to be alkaline, because everything that grows here has an alkaline reaction in the digestive system.

"So Khom is just a big, four-legged termite!"

To confirm his surmise, he borrowed litmus paper, used in soil testing, and the enzyme culture showed an alkaline reaction. For a moment Drake was enthusiastic. Then his shoulders sagged. Interesting, but it didn't help him any. It didn't show him any way to destroy the beasts. And tomorrow was the Council hearing.

He didn't even bury the carcass. In a few days there'd be nobody left to smell it.

There was smoke over Tels' cabin; Terra was getting supper. Drake crossed the fields, hating to see the two, to parade his failure, but unable to stay alone. After all, he had no place to go.

Somewhere, down the outer line of farms, a vaard voiced a querulous scream. As Drake entered the cabin he fancied he saw a stirring out in the desert, a flickering of low, swift shadows, but the double moonlight was tricky and a freshening breeze was shifting the whispering sand.

Terra turned from the stove; just for a second there was hope in her eyes. It flickered out, and Tels,

propped up on his cot, wrinkled his nose in disgust.

"You stink," he said. "Go and wash off that damned lizard."

Drake hadn't realized. Stammering an apology, he added, "My clothes were burned. I haven't—"

"Take mine," said Tels. "But wash!"

Drake shivered under the cold shower in the crude bath, climbed gratefully into Tels' clothes. For lack of anything else to do with them, he left his own reeking garments on the floor.

It was a gloomy meal, the more so because it seemed all the vaards in Rikatva were having the nervous terrors, and the incessant shrieking rasped nerves already ragged. Several times Drake and Terra looked out, but there was no sign of lizards. In the shifting moonlight the desert was always full of shadows.

"Get the melons," said Tels abruptly. "We might as well eat them as leave them here to rot."

Terra brought them. Drake's throat ached at the sight of her; the spring, the joy, the life was gone from her. She was a little like him now, patient and defeated.

"Did you find anything?" she asked.

Drake spoke to them mechanically about Khom's digestive apparatus, accepting his share of the pale Venusian fruit. Tels found no joy in the prized melon now; his face was stony as he bit into his portion.

"Little animals living in his stomach?" he grunted around a mouthful, and shook his head. "It does not help us."

Drake sighed and took a bite. Instantly he choked and gasped over a corrosive sourness. The melon was acid, not pleasantly, like alkaline citrus fruits, but with a biting, astringent acerbity comparable only

to some mess in a test tube. He gagged and retched, snatching for water.

Tels' blond beard crinkled to a roar of laughter. "Earthpuppy! If you ever come to Venus, you'd better get some little animals to live in *your* stomach and drink your acids for you!"

Drake was suddenly, transfixed staring at the melon with a sort of awe. "My God!" he whispered. "That's it!"

STARTLED QUESTIONS, sudden blazing inspiration, were drowned utterly in the high, wild shriek from Tels' stable. Other vaards picked it up, until the shack was ringed with screaming beasts. And this time the running shadows in the desert were close in the fields, and solid.

They congregated, dozens of them, in a milling swirl around a charred and butchered corpse that sent its musky stench out on the wind.

Tels, lips tight with pain, joined them at the window. "Never have I seen them like that. Look, they break a little; some are coming this way. But there is nothing in my fields!"

Drake's face was white in the lamplight. "There's something in your bath. My clothes, with the smell of Khom on them. The corpse has brought them in; now they're coming here, after me!"

Terra's hands were clenched; the cords stood out on her wrists. "Martin," she said, "what did you mean just now, about the melon?"

Drake's eyes were on those milling shapes. "Khom depends on wood-cellulose for his food. The protozoans that digest it for him live in an alkaline culture. This melon is acid. Introducing it into

the culture would kill the protozoans—and Khom would starve to death!"

Tels snorted. "You talk nonsense! Khom will not be fed by hand, those melons will not grow here naturally, and besides, there is but one plant."

"Hydroponics, Tels! Growth cultures. A ring of specially constructed tanks, fencing the Areas; nutrients, auxin, vitamins, intensifying chemicals. They can ship more vines from Venus; Khom can eat them as fast as they grow. Inside of six months, there won't be a lizard left in the desert!"

"You've got to get away, Martin." Terra caught his shoulders. "You've got to get that knowledge to the Council tomorrow. Khom will be all around us in a moment. You've got to get away!"

Drake stared at her unseeingly. "Get me pencil and paper, quickly."

Tels turned slowly, an unbelieving rage hardening his face. "You would go? You would leave Terra here?"

Drake was silent. The girl put paper on the table; he wrote, rapidly. Tels saw what he wrote.

"Will fear make you forget even your idea?" he said softly, and struck suddenly with his good arm.

Drake went down. Tels, white with pain and anger, cried: "Run, Martin Drake! We'll hold off the lizards. Run, damn you!"

Drake staggered up, gripping the paper. "We've all got to get out of here. Those brutes have the scent of my clothes now; in a few minutes they'll break in."

"He's right, Tels," sighed Terra. Drake caught her look and winced. She'd had hope before; now she knew he was a coward.

"The stable," he said, "is the only

chance. They may not find us for a while. Bring the flares, Terra."

She took the webbing sack of them, offered her other arm for Tels to lean on. Drake opened the door, and stopped.

KHOM was everywhere. Great armor-plated shadows slid wide-jawed in nervous circles about the shack, drawing ever closer. The vaard in the stable screamed as Drake had never heard one scream before, and every beast in Rikatva was answering. There was a pregnant tension in the air; Death had come in from the desert.

Drake hurled a flare. Khom drew back, and the short path to the stable was momentarily clear. "Come on!" he yelled, and broke into a run, helping to bear Tels' half-helpless weight.

Glaring light and lashing tails, and armored heads that grinned hate at them. Then they were in the odorous dark of the stable, with the vaard thrashing and shrieking. Drake caught its head-rein; something in the touch of his hand quieted it.

He held out the paper to Terra. "Take this to Thern. Get it into responsible hands. Then, if you can, bring help. Now go, before Khom closes in!"

She didn't understand. She stared at him, clutching the paper with the fate of the Reclaimed Areas written on it. "But Martin! You . . . Tels—"

Hardly knowing where the words came from, driven by something deep within him, Drake plunged on. "I don't matter; Tels doesn't matter. Nothing matters but getting that paper where it has to go. The Council meets tomorrow morning! You ride better than I, you're

lighter. The vaard will have a better chance to get away. Besides you're . . . you're—"

He stopped abruptly, loosing the halter. "Go now, Terra. Hurry!"

She was close to him in the dark; suddenly there were soft, warm lips on his, firm and vital. Then she was on the nervous beast, shoving the door wide. "Throw a flare, Martin! Keep throwing them, until I come back!"

Tels grinned. He hadn't seen that kiss. "Terra is a real woman! Where are the flares? I have one hand left!"

Drake saw her go, in the white glare, low on the vaard's neck, flying in a wide circle for Thern. Then he looked at the prowling, silent things in the naked fields.

"Afraid?" growled Tels.

Martin shooked his head. "I . . . I don't know. Look, Tels! There they go!"

Khom had made up his mind at last. There was a crash and a splinter as Tels' shack door went in; the flimsy walls rocked, cracking at the joints as the great bodies went hurtling in. They were mad, now. In a moment they would scent the humans in the stable.

"I'll kill a few!" snarled Tels, and lobbed two flares in quick succession at his shack. Wood grows dry on Mars. In five minutes it was aflame.

"My God!" groaned Drake. "That's done it. Here they come!"

Balked of their objective, the lizards turned to the stable. In a grim, silent horde they came through the blowing dust, the flames red behind them. The two men hurled the precious flares, trying to keep a ring of light around the stable, and Khom prowled in nervous jerks, beyond the blaze, stopped, but only momentarily.

Without warning, Tels crumpled to the floor. His face was gray, sweat on his forehead. "I can't—" he gasped, and fell back against the wall, half fainting.

Drake knew fear, then; the full impact of it, cold and brutal. Tels' strength was taken from him. He stood alone, Martin Drake against the Destroyer. And with that icy realization came another knowledge. He had a job to do, and it didn't matter whether he was afraid or not.

It occurred to him, fleetingly, that maybe this was the secret of living.

Picking up the half-empty sack, Drake flung the door open; he could aim better from the outside. Two of the beasts had got through already. A well-placed flare drove them back, but he didn't dare let it happen again. Much closer, and

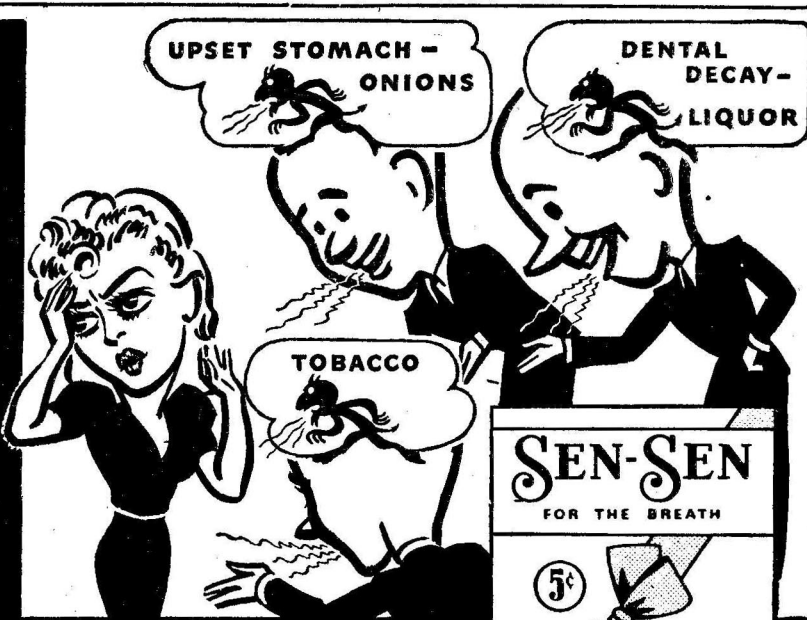
he'd set fire to the barn. Just keep the circle closed as long as the flares last. Why? Because Tels is in there, and maybe— Well, a man lives as long as he can.

He had the last flare in his hand when he stopped. "Tels!" he shouted. "Tels, look! Flares all along the fields there. Terra's brought the settlers. We're saved, Tels!"

He ran inside, seeing as he did so, that Khom was breaking his battle formation as the flares sizzled up from the rear, heading out into the desert again. Tels still leaned weakly against the wall, but he held up his hand. Drake took it, prepared to help them up.

"No!" said Tels. "I'll faint if I stand up. Shake it, Earthpuppy. Shake it!"

When
a girl
needs
help



DON'T OFFEND... USE SEN-SEN

BREATH SWEETENER . . . DELIGHTFUL CONFECTION

BOTANICAL INVASION

The Martians may not have invaded Earth, but some of the plants Earth has should have come from there! A companion piece to de Camp's animals, meet Earth's screwy plants!

By Willy Ley

Illustrated by Willy Ley

It is very significant that the voyage across the Atlantic Ocean, which led to the landfall of Christopher Columbus on one of the small West Indian islands, is regarded as the end of that period in human history that was later termed the Middle Ages. Although Columbus himself did not know he had discovered a new continent and refused to admit it until his death, and even though it was by no means the first discovery of America, it was the one that really changed the face of the Earth.

I want this sentence to be understood quite literally. The face of the Earth, apart from human cities, bridges and dams and political borders, has changed in many important respects since then. If one of those educated ancient Romans—say good old Caius Plinius Secundus himself—came back to life, he would marvel at the new plants growing in abundance everywhere in the countries near the Mediterranean he knew so well. He would find his people living mainly on something even he had never heard of, namely maize.

Farther up in the North he would find his Teutons, Goths and Cimbri of the Hercynian Forest living on plant things dug from the ground—potatoes—that not only provide a

nourishing diet, but form the raw material for a drink twenty times as potent as the heaviest Roman grape wines that ever caused him a hang-over. The Hercynian Forest would be gone, and all roads—some dating back to his own time—he would find lined with yellow flowers—evening primroses from Virginia.

People would smoke, as they did occasionally in his time, too, but tobacco from the New World, not hemp. They would eat red fruits he never saw, tomatoes; pull thick, sweet roots from the ground he never heard of, sweet potatoes—not a night-shade family member like the potato, but belonging to the convolvulus or morning-glory family. He might encounter squash and the plant that produces tapioca. He would learn that pulling teeth does not have to hurt, thanks to another plant from the other side of the Atlantic Ocean—the coca. He would probably appreciate the many uses of rubber and the taste of cocoa just as much as anybody else in the world.

But the very landscape would have changed, too. Agaves and cacti dominate it. Both are of American origin, but they are so familiar now that a painter of historical subjects a few decades ago un-



Fig. 1. *Welwitschia mirabilis*—which ought to have come from Mars, but actually comes from Africa.

knowingly used them as background for his paintings illustrating the adventures of Ulysses of Ithaka.

If he had known America in his time he would find a multitude of changes, too. He would see that the bisons have disappeared, and that the white settlers had brought with them all their customary plants and animals: horses and cattle, sheep and goats, sparrows and cabbage butterflies, honey bees and bedbugs; plants: rye and wheat and barley-corn, peas and lentils and oats, dandelion and clover, water cress and flax, red beets, sugar beets and turnips.

It is obvious to compare the past crossings of the Atlantic to the future crossings of space from America to Venus or Mars. There will be a Leif Ericson who first accomplishes a successful crossing, but without immediate results in the way of colonization. And there will finally be a Christopher Columbus whose voyage will be the first of commercial importance. And then an exchange of animals and plants will begin.

But the point is: Will people, four or five centuries later, still know

what was exchanged? Or will another painter create historical murals showing the "Columbus of Space"—who really opened the way to Mars—stepping from the air lock of his historical spaceship lying in a patch of scintillating flame bushes—that two hundred years later were imported to Earth from Venus?

THERE actually is some uncertainty about a few plants at present. Cotton, for example, was known in the New World as well as in the Old before the exchange took place. Rice may be a plant that existed on both hemispheres. It is classic opinion that sugar cane, banana and fig originated in Asia, and the coconut in the East Indian Archipelago. But some botanists contend that they are also American. Some others have doubted whether tobacco is purely American or whether it also grew somewhere in the far southeast of Asia. A few zoölogists also doubt whether the horses that roamed all over America during the Tertiary period really did become completely extinct before the Spaniards introduced European horses.

I can easily imagine similar controversies five or six centuries after the advent of space travel. And I can picture an eager young botanist, after following these controversies for a number of years, attempting a general roundup of all plants on Earth that are not of terrestrial origin. Records of space travel being somewhat incomplete and he himself being unable to read Twentieth Century English, French or German and also unable to consult botanical works of the period just before the first spaceship left Earth, he will have to go by looks and by guesses. That will not be easy because the looks might not be very different. Similar surroundings will produce similar forms on all planets, and since it is permissible to assume that life on all the planets of our Solar System originated from one cloud of cosmic spores, the products of identical surroundings might look very much alike.

There would be one plant which he would classify as being of Martian origin with hardly a moment's hesitation. *Welwitschia mirabilis* growing only in one spot on Earth—save for a few specimens in botanical gardens—in southwest Africa.

Restricted to the so-called *Namib*, a strip of desert land about thirty miles from the coast, the plant grows in sand of noticeable salinity where occasional rainfall provides the necessary amount of water. *Welwitschia* is really a tree; i. e., it forms a woody trunk which looks like a big round table. When the plant is about a century old, that immense trunk measures about twelve-fifteen feet around, but is only between one and one and a half feet high! The darkly colored trunk seems to be the center of a large number of long ribbonlike leathery leaves that grow to a length of ten feet. Actually the

plant forms only two large leaves during its entire lifetime, but by the action of the wind—and also by irregular growth of the trunk—they are slit and shredded to ribbons. If they were left in one piece they would have a width of about five feet. The sexes are strictly separated; i. e., one individual plant produces either male or female “flowers.”

The young and eager botanist would not know that *Welwitschia mirabilis* was discovered in 1860 by the explorer and botanist Friedrich Welwitsch who, serving a contract with the Portuguese government, made extensive trips in the western parts of Africa. What might puzzle the future botanist would be a close resemblance of *Welwitschia* to a number of terrestrial fossils. Truly remarkable, he would write, that on one planet there should be a plant surviving that is practically the same as the fossil plants on another planet. Remarkable and strange, but not incredible, he would reason, because

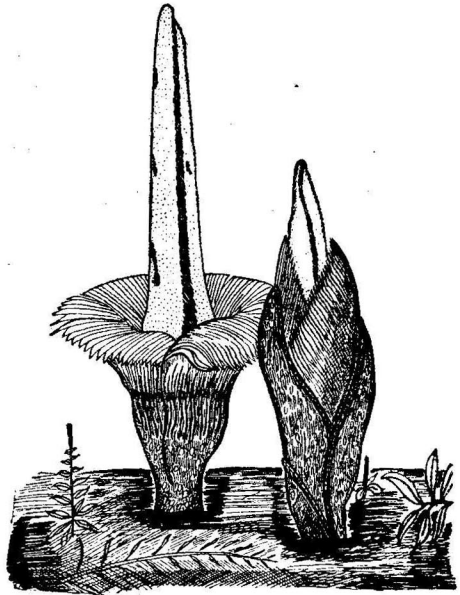


Fig. 2. *Amorphophallus titanum*.

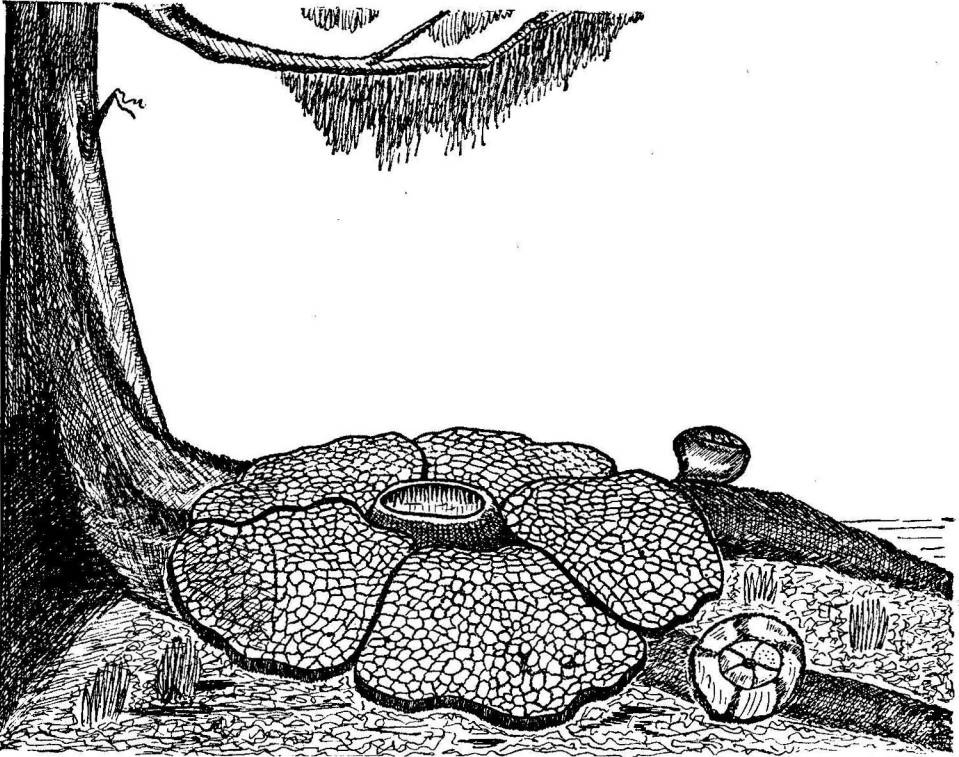


Fig. 3. *Rafflesia arnoldi*. A lovely flower—it looks and smells like a three-foot slab of exceedingly dead meat. This one ought to have come from Venus—but didn't.

horses also had to be introduced to the American continent again, although they had been there when their evolutionary ancestors had been discovered.

MARS, however, did not contribute much to the flora of Terra. A few doubtlessly certain cases—mentioned in records of interplanetary travel—and this *Welwitschia*—the date of importation of which was not on record and went probably back to pioneering times. But its hardiness, strange appearance, its scattered distribution on Mars, its restricted habitat on Earth and the obvious salinophilous habits clearly pointed to the planet of origin.

The more spectacular contributions came from Venus without a doubt. Almost every botanical gar-

den boasted specimens of these strange plants, while they could be found only on Sumatra and some of the surrounding islands. There existed a short mention in one of the early books on space travel that one ship had crashed down into the rimbas of Sumatra—this was probably the ship from Venus with seeds or seedlings of those plants on board.

Spectacular things they were, to be sure, certain to attract the attention of explorers. One of them was listed in the botanical catalogues as *Amorphophallus titanum*, the other as *Rafflesia arnoldi*—evidently the names of the pilots of that ill-fated space vessel. (Actually they were discovered in 1818 by Dr. Arnold and Stamford Raffles.) Both of these plants needed that typical damp, warm, fever climate; both of

them imitated the smell of decaying flesh to attract scavenger insects—just like the flowers of Earth emit sweet smells to attract beautiful butterflies.

That flower *Rafflesia* was nothing but a gigantic flower, living on the roots of other plants. More than three feet in diameter, its five gigantic petals, reddish with yellow spots, it looked like five large pieces of raw meat deplorably lacking freshness. The *calyx* was big enough to hold more than a gallon of water, and the whole stinking flower weighed about twelve pounds. Spawn of Venus.

The other one, *Amorphophallus titanum*—Giant Krupi—preferred the forests of the mountains of Sumatra, and resembled, in general, terrestrial plants a little more. Possibly it had mutated in the meantime, as plants often do when brought into new surroundings as proved by the classic example, the evening primrose—*Oenothera Lamarckiana*—that, coming from Virginia, began to mutate on Dutch soil. The plant was really not much more than a gigantic bulb, weighing almost a hundred pounds and measuring four feet around its thickest part. That bulb produced one large leaf every year, lasting for six or seven months and then dying off. But one year it produced a flower instead that looked similar to an immensely overgrown calla lily. The yellow shaft in the center reached ten feet high into the air, the outer leaves were green on the outside and purplish on the inside. That flower, also smelling of decay like that of *Rafflesia* lasted only a few days.

PROBABLY a third plant of that sector of Earth, the plant *Myrmecodia*, belonged also to the early importations from Venus.

Similar to a pineapple, it looked in

shape like a somewhat misshapen and discolored pineapple growing on the branches of trees. It was not a parasite, however. Its roots did not force their way into the branches of the tree, but served merely as anchorage. The plant made its own living, like other plants, by means of the chlorophyll in its green leaves. It merely sat on trees to be closer to open air and the Sun. And the "bulb" was not a fruit, but a storage container for water. The container was not solid, but full of holes and passages—some of them covered by a fungoid growth and all of them inhabited by tropical ants. The fact that it was not one particular variety of ant that inhabited the *Myrmecodia* plant made one suspect that the plant was not a recent arrival. And that fungoid growth seemed to be merely an accidental infection, utilized by the ants, if present, but not introduced by them if absent.

Had that eager young botanist been able to read Nineteenth Century Dutch he would have found quite a different story about *Myrmecodia*. He would have found that it had been discovered on the small island of Ambon or Amboina in about 1670 by the "Plinius Indicus"—as his contemporaries called him—Georg Everhard Rumpf. Rumpf, who, according to the customs of his time, called himself Georgius Everardius Rumphius, had been born in Hanau in South Germany in 1627. He had left his native city before he was twenty years old, bound for South America. But his ship was captured by the Portuguese. He was brought to Portugal and kept there as a prisoner of war for three years. Released eventually, Rumpf went to Holland, where he joined the services of the Dutch East Indies Co. in 1653. In the fall of the same year he arrived at Amboina, a small

island about halfway between Celebes and New Guinea. His duties as "Koopman"—merchant—with a pay of two Dutch guilders a day interfered with his researches in the beginning, but his superiors soon realized that he was much better as an explorer than as a trader and relieved him as much as possible from such work.

During his stay on Amboina—he died there at the age of seventy-five, blind and considering himself a failure—he wrote not only a dictionary of the Malay language, but also a history of Amboina, a description of Amboina and books on the animals and plants of that island and surroundings. Aside from a more general work, only the plant book found its way into print after an adventurous fate. It is the famous "*Herbarium Amboinense*." In 1670 Rumphius' eyes failed and he finished his work in a state of complete blindness. In 1687 a fire devastated the settlement and part of the manuscript was destroyed by the flames. In 1690 the first six books of the plant work were finished—Latin translation. They were sent to The Netherlands on board the sailship

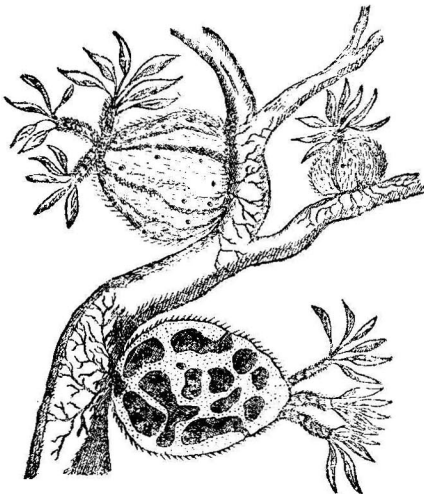


Fig. 4. *Myrmecodia*—the living ant-hill.

Waterland. But the *Waterland* was sunk by a French privateer. Fortunately there existed a copy of the six books, they arrived safely in Holland six years later; the other six books followed one year afterward.

It is this book which contains the first description of *Myrmecodia*. For many years the plant was believed to be an outstanding example for a three-sided symbiosis of plant, ants and fungi. Only recently it has been proved that the symbiosis is only an accidental sharing of living space. The ants use the hollows of the *Myrmecodia* plants as living quarters without giving anything in return—but also without harming the plant—and the fungi are really only an accidental infection. And since there exists no true symbiosis between *Myrmecodia* and ants, no particular variety of ant can be expected in a *Myrmecodia* plant—just those that happened to be around when the plant was still unoccupied by other ants.

LEAVING the fictitious theme of this article for a little while and remembering that strange and rare "tree" from the Namib of southwest Africa, I like to add that the ancestors of *Welwitschia* were found in the Karroo formation. The Karroo formation, belonging to the Permian period of geological history, is the subperiod which produced those strange *Theromorpha* and *Theriodonta*—reptiles with skulls and teeth resembling those of mammals to such an extent that it was often difficult—when they were new to science—to say just what they were, mammals or reptiles. It is from there that the first real mammals came, and it is certainly justifiable to picture them gnawing *Welwitschia* plants.

My point is that *Welwitschia* is

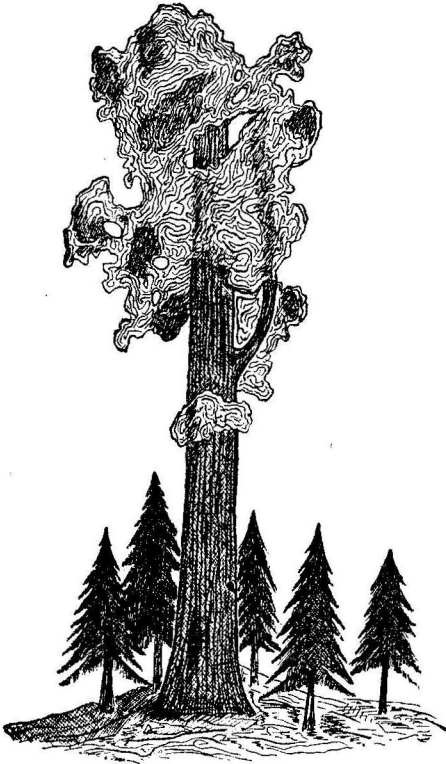


Fig. 5. *Sequoia gigantea*—the tree with the asbestos bark. Not even a blowtorch will make it burn!

just as much a "living fossil" as all those famous animals like platypus, echidna, the lungfish *ceratodus*, the reptile tuatara and the recently discovered, coelocanth fish. But while those animals are famous, hardly anybody ever heard of living fossils among plants. They do exist, however, and *Welwitschia* is only one example.

Another one is the Ginkgo tree—*Ginkgo biloba*—which survived in east Asia. It was discovered in 1690 in Japan by the physician Dr. Kaempfer. It existed in its present form during the Tertiary period. Close relatives of the Ginkgo lived during the carboniferous period and fossil varieties have been found on every continent except Africa. But

the Ginkgo tree is by no means squeamish about its climate; it thrives practically everywhere. There are two New York examples—one in Central Park and the other on a street in the Brooklyn Heights district.

In South Africa, India and Australia there are trees the casual observer believes to be either palm trees or tree ferns. They are *Cycadeas* and have nothing to do with either palms or ferns, but are related to the conifers—unbelievable as it may seem from their appearance. During the age of the dinosaurs, these *Cycadeas* were much more numerous than they are nowadays and formed—together with many kinds of araucarias—the forests that not only harbored the smaller dinosaurs, but also offered an opportunity for arboreal reptiles to practice the art of flying.

The most remarkable among those survivors from former periods are also the most impressive and, at any event, the largest plants alive today: the sequoias.

The height of one of them, the General Sherman Tree, is 272.4 feet. The trunk, which probably weighs something around 625 tons and contains 50,000 cubic feet of lumber, measures 101.6 feet at the base—circumference. Its average diameter at the base is 32 feet; 120 feet above ground, it is still 17 feet—and 14 feet, 180 feet above ground. The main branch of the General Sherman tree is larger than any tree in the eastern States, it measures 6 feet 8 inches in diameter and is 140 feet long. If that tree grew in a city it would reach as high as a sixteen-story building—but it could not grow in a city because the average city street would be much too narrow for it.

While the General Sherman Tree



Fig. 6. "Lady with the veil"—*Dictyophora indusiata*, which grows the "veil" in a matter of minutes.

is titled the "largest living thing on Earth," its rivals are only slightly smaller.

There are two varieties of sequoias alive nowadays, the smaller one being the redwood, which grows more closely to the coast of California and which was discovered first. It was Pater Crespi, accompanying the Portolà expedition, who made the first mention of them—1769. In 1823 small branches of redwood came into the hands of English botanists. They believed that it was a new variety of swamp cypress and consequently named the trees *Taxodium sempervirens*. Exactly twenty-four years later Stephan Endlicher recognized the "newness" of the tree and named it *Sequoia sempervirens*, in honor of the Indian chief Sequo-ya, who invented an alphabet for his language in imitation of the

art of writing as practised by the whites. In 1858 the other type of sequoias was discovered in Sierra Nevada. The story goes that fleeing Indians led their white pursuers into what is now Sequoia National Park.

Again British botanists made a preliminary description, thinking that it was a new genus of trees which they termed *Wellingtonia gigantea*. American botanists, slightly angered about that patriotic name, retaliated in referring to the trees as *Taxodium Washingtoniana*. They were wrong, too. But it was not until a number of French botanists made very thorough researches that it became known that the new trees were sequoias. They then were named *Sequoia gigantea*.

The sequoias are not only "living fossils" and the "largest living things on Earth," but they are also the oldest living things on Earth. While there is no method to determine the age of the living giants, it has been found that fallen sequoias were between twenty-five hundred and thirty-five hundred years old. The General Sherman Tree and the other very large sequoias are believed to be just beyond the three-thousand-year limit. These trees can grow that old because their wood is particularly immune against forest pests. It also does not burn easily, and even if it does the tree usually succeeds in covering the wound. It takes scores of years, but time does not greatly matter with those trees.

Just as the Ginkgos, that survived only in one corner of the Earth, are now spreading again to all the countries they once inhabited, the sequoias are also reconquering the planet. Both types thrive well in other climates, too, and there are forests and groves of sequoias—both types—not only in many European countries, but also elsewhere.

IT MIGHT BE remarked in passing that not only American sequoias are used to strengthen European forests, but many other American trees as well, mainly Douglas firs. And it was in the vicinity of Douglas firs that a very strange invader was discovered recently. One day an amateur photographer saw a kind of mushroom that looked strange and beautiful. The light was still good enough to permit the taking of a picture, which was then sent to a picture magazine and published with a caption asking the readers to say what kind of plant it was.

The editors were very much surprised to receive a number of fairly excited queries from professional botanists, explaining that the picture doubtlessly portrayed a specimen of *Dictyophora duplicata*—the North American variety of the well-known and famous *Dictyophora indusiata* of South America—the “Lady with the Veil.”

The development of the “Lady with the Veil” looks very much like one of those movies where you see plants grow. During the day it is nothing but a small round bulb, aptly termed a “Witch’s Egg.” At dusk that “egg” suddenly opens, a hollow white stalk grows to a height of about four inches in half as many hours. It is crowned by a greenish hat, looking exactly like the things ladies put on their heads when they are in style. There is no sign of the “veil” yet; it appears suddenly, unfolding from underneath the “hat” in a few minutes. All the beauty lasts only for a few hours. However, this “mushroom flower” is also designed for scavenger insects that carry its spores away.

The search started by the chance photograph soon brought results. The North American variety was

found all over the western parts of Central Europe. It had made itself at home completely unnoticed. Since it was found mainly in—or fairly close to—forests with American trees, the presence of the Lady with the Veil seemed fully explained. Actually it is not. The American trees were, as has been stated, mainly Douglas firs, coming from the west coast. The other varieties of American trees also came from the west coast—but *Dictyophora* grows mainly in those American States that border the Atlantic Ocean. And it does not grow at all anywhere near the places the trees had been originally.

Stranger than all those things, however—even stranger than the living fossils—are the familiar lichen. They are double plants, not “double” in the sense of the “double worm” *Diplozoon paradoxum*, where two individual worms grow together crosswise, but double in a much more thorough way. Fungi and algae combine to make up lichen, one of the many strange things we would not know were it not for the microscope. That lichen are actually the result of such a close symbiosis was proved by several botanists who

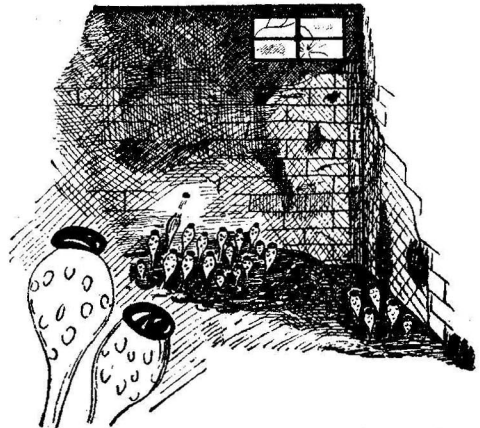


Fig. 8. *Pilobolus*, the original inventor of the cannon!

managed to separate the fungi and algae, grow them each alone and then reunite them to form the original lichen.

Recently it has been announced that some lichen—I am not certain whether all of them—are triple alliances, the third ally being bacteria of the type azotobacter. All of which makes them acquire a high curiosity value—provided you know these things—but they are not much to show around.

If you want to, however, you can get a spectacular though small plant without much trouble if only your olfactory sense is not too easily offended.

I am referring to *pilobolus*, the “pill thrower,” or “shooting fungus.” All you have to do is to gather some horse dung—not too fresh, not too old—from a stable. You carry the spores of *pilobolus* home with you, although you cannot see them. What remains to be done is to cover the manure with some kind of a glass cover to prevent it from drying out too much, put it in a warm and not too bright place and wait for five or six days.

The spores of *pilobolus*, that seem to be present everywhere and that followed the horse to America, develop in the meantime, and after a

few days the spore-bearing parts begin to sprout. Like tiny inverted wine bottles of milk-white glass they look, topped by a glistening black “pill” of spores. The tiny bottle grows and swells until it suddenly bursts with a faint but audible popping sound, throwing its capsule of spores to a distance of three feet—always aiming in the direction of the source of light.

Many beautiful photographs and recurrent mention in popular magazines have made *pilobolus* fairly well known in our time.

But—of course I don’t know—I think it is quite possible that a few hundred years hence, when horse dung might be as hard to get as, say, Okapi dung nowadays, people might be fooled with *pilobolus*. Fifty years ago “spiritualists” in Europe made their audiences gasp about their powers of mental concentration capable of moving even inanimate bits of wood—using Mexican jumping beans. Five hundred years from now old space veterans may astound audiences with the “shooting fungi” they are displaying. And they may solemnly pledge their word for it that these fungi are not native to Earth, but that they gathered them in the dark caves near the twilight rim of Venus.



TOUGH GUY

As a general rule, you can pretty safely bet on it that elements heavier than calcium are apt to be bad medicine if their compounds get into the human system; similarly, those below calcium are safe, if they aren't caustics, like sulphuric acid or sodium hydroxide. There is one shining, stinging exception—fluorine. Fluorine's the tough guy of the elemental gang. It's a light element—just between the two essential metabolic elements oxygen and sodium. But fluorine and its compounds are pure poison.

Furthermore, fluorine has the distinction of being the only element that was known, and worked with, for a considerable period by all chemists, without being isolated. Most elements—once the concept of elements matured—were discovered in rare ores, or isolated as soon as anyone realized there was something to isolate.

Not fluorine. For three quarters of a century—and the nineteenth century at that, when chemistry was making its most rapid strides, under its greatest leaders—fluorine defied them.

Oxygen, second most active of the non-metallic elements, can be separated by simple heating of such compounds as potassium chlorate. Chlorine is readily driven out of combination. But fluorine is so thoroughly, viciously and voraciously corrosive, and so determinedly locked up in compounds, that no unstable fluorine compound was ever discovered!

Guessing that fluorine—which they well knew existed as the acid principle in such common minerals as fluorspar—was combining with the silica of their glass vessels, chemists beat that possible loss. They made the chemical ware out of fluorspar. Fluorine released in fluorspar vessels would, if given a chance, drive oxygen out of any oxides present, and take its place. So they excluded oxides—including water.

To make life merrier for the chemists striving to drive out that virulently active element, it forms many gaseous compounds—practically all exceedingly poisonous. In the course of their efforts to isolate the element, during seventy-five years of continued efforts, half a dozen chemists died, or were permanently invalidated by the es-

caping compounds. No one was injured by the element. No one got that far.

Since fluorine is the most active of all non-metals, it can't be displaced from its compounds by another element, as chlorine can be released from hydrogen chloride by the action of oxygen, to form water. Chlorine, oxygen, bromine—all active non-metals themselves—all form unstable chlorides, oxides or bromides that break down under heat. Not fluorine. That method was closed.

Electrolysis releases oxygen from water, chlorine from hydrochloric acid. It releases oxygen, not fluorine, from a water solution of hydrofluoric acid—and pure hydrofluoric acid won't conduct electricity, so can't be electrolyzed. Further, fluorine, even when finally freed, was found to form so many complex addition compounds—where fluorine adds itself on any old way, so to speak, to almost anything in the neighborhood—that it would disappear even when there was, seemingly, no place for it to disappear to. It readily and rapidly ate holes in graphite, gold, and platinum electrodes. And—generally—in the chemists that worked with it.

Finally, after seventy-five years of effort on the part of the world's chemists, Moissan, in 1886 succeeded in driving it out of combination. Hydrofluoric acid alone wouldn't conduct the electric current that might break it down—but potassium fluoride, dissolved in the liquid hydrogen fluoride, did. In a platinum tube, using platinum-iridium electrodes, the tough guy of chemistry finally gave up. Electrolysis finally saturated the solution with all the possible addition compounds, smashed the fluorine free more rapidly than it could corrode and combine with the stubbornly resistant platinum-iridium alloy, and forced it to appear in the free state.

Once free, methods of handling it could be devised, its properties determined, and a better understanding gained. Today, if it were needed, it could be generated and stored fairly readily. But it retains the distinction of having held off two generations of modern chemists who knew darned well it was there, and couldn't break it loose to save 'em. ARTHUR McCANN.

HIGH-FREQUENCY WAR

*Old Pinky had been wrecked by high frequency
somehow—but he had an urge to fight that war—*

By Harl Vincent

Illustrated by Schneeman

You could see that the fellow at the recruiting officer's desk was doing his level best to stand erect in his baggy clothing. He turned a battered felt hat over and over, in nervous, clawed fingers. In his pale eyes there was a far-away look and almost servile pleading. His nondescript, rose-hued whiskers were something to remember.

"But listen," he was insisting mildly, "there must be something a guy like me can do. Even if I am a little lame. I just got to help."

Sergeant Hurley screwed up his scarred features in a grin that was meant to be kindly. "Sorry, Pinky," he said. "Not in this man's army. Looks like you've seen enough of this rotten war, anyway."

"Not even in a ground kitchen?" the mild one wheedled.

"Not even anywhere. Hell, man, we got physical exams. Take a walk now, like a good guy." The hard-boiled sergeant shook his head sadly at the nearby noncom as the man shuffled away. "Poor old geezer," he muttered.

Pinky wasn't old. He wasn't forty yet, but might have been anything up to sixty. To look at him, you'd think he wasn't quite all there. He wasn't. In the early days of the war, in 1974 or maybe 1973, something had happened to him. He'd been

gassed, or perhaps caught up in one of those invisible wave eddies from a frequency bomb—something, anyway.

He didn't remember. Nobody did. Pinky didn't even know where he came from, or who he was. There were thousands like him. But Pinky was different. Most of those other poor devils, who'd been through the first awful days when the combined air fleets of the Quadruple Alliance had swept over the eastern seaboard and inland, were all washed up. Pinky wasn't; at least, he wouldn't admit it. He drifted from one half-ruined city to another, to the small towns even, always trying to enlist. Of course, they wouldn't let him.

He earned the sobriquet Pinky by the color of his beard, which had not been removed in he didn't know how long. He was broke, of course, and had to depend on canteens or relief stores for occasional shelter, or a meal, or a too-big pair of shoes. Most of the time he spent on the road. He was too sick even to be a good hobo; he was bent and twisted and lame from whatever had happened to him. But he kept going and he kept trying to enlist.

It was cold tonight. Pinky held the collar of his threadbare coat up around his neck with skinny fingers. He dragged himself along the State



The old man crouched lower, shook his head dazedly, and looked about more sharply—more understandingly—

road that led out of town. He didn't know how far it might be to the next one. All he knew was that, wherever he was, it was way back of the lines. You couldn't even hear gunfire back here, or see a flash in the sky. He was hungry and wished

now he'd remembered to stop in the canteen back in that burg. It's hell to be cold and hungry.

No traffic on this road and no lights at all. Must be a blackout around this part of the country. Dimly against the brooding sky

ahead, Pinky caught the outlines of a group of fairly large buildings on a low hill. Not a light there, either. He limped on up the hill, hungrier and colder than ever.

There was a high iron fence, a gravel drive leading to an open gate. Pinky went into the grounds. It would be warmer sleeping alongside one of those buildings than in the open. Then he saw a closely shuttered light shining from a basement window. He moved cautiously toward it. There was the faint hum of machinery that throbbed in that basement. The window was partly open and a grateful warmth from inside enveloped Pinky as he moved next to it. He could see the glittering machines and a lot of clocklike gadgets and lights on the wall. There were steps leading down to a sort of hall. It would be warm down there. Perhaps he could curl up out of sight.

He was halfway down the steps when a door opened and a glare of light and damp heat swept over him. There was a chunky young fellow in greasy dungarees coming toward him with a wrench in his hand. With the light at his back, you couldn't see his face. Pinky threw up his arm to ward off the blow he expected. Then something went wrong inside of him. He couldn't breathe at all and his muscles went limp. He slumped down and just forgot everything.

WHEN Pinky came to, he was in where it was warm and light. The chunky fellow was holding up his head and pouring something down his throat. Whiskey. The heat of it in his stomach revived him and he sat up and blinked owlshly. The young chap in the dungarees laughed relievedly.

"Gee!" he exclaimed. "You scared the devil outta me. I thought it was a corpse falling down the stairs."

Pinky waggled the whiskers in an apologetic grin. "Guess I was just about all in," he admitted.

"I'll say you were! You are yet." Bright brown eyes narrowed in their inspection of Pinky. "How long since you've eaten?"

"Oh, I don't know"—negligently. "Couple of days, I guess."

"I thought so. Here, can you walk, Pinky?"

Everybody called him that without being told. One look at the odd foliage was enough. Pinky said: "Sure, I can walk," and let the young fellow take his arm.

They walked through the aisle of the shiny, humming machines and into a sort of locker room where there was a table and a few padded, board chairs.

"Sit down," directed the young chap, "and I'll get you a bowl of soup. What's your name?"

"You named me, already."

The dungareed one, opening a can he took from a locker, grinned appreciatively. "What? Pinky?" he laughed.

Pinky nodded and his pale eyes twinkled. "Suits, doesn't it?"

"Sure does. Well, mine's Slim—'cause I'm so short and wide. Slim Harvey." He was busy with a pan and the soup, and an electric grill. "All you get is soup, Pinky. At first. In an hour or so you can have some sandwiches and stuff. Your belly's too flat for more, right away."

Pinky nodded again. This Slim Harvey knew what he was doing. "What is this place, Slim?"

"The university. Doc Buckley's, you know." Young Harvey had out a bowl and the thick soup steamed in. "This is the power plant for the

whole place down here and I'm supposed to be engineer. Doc's lab is up above, in the same building."

The soup smelled great and Pinky began ladling it in. "Let's see," he said, "Buckley's the one's been working on a new weapon or something, isn't he?"

"Yeah. That's why the blackout around here. Been working for a year, year and a half, and nothing doing yet." Slim Harvey sat across the board table, eying his guest curiously.

"Must be swell," said Pinky, between swallows of hot soup, "to be working here. Government subsidy, isn't it?"

Harvey's eyes narrowed, though the friendly gleam did not die out. "Say!" he exclaimed. "What're you doing around here, really?"

His guest looked into nothingness. "Just been trying to enlist."

"Where'd you come from? Where'd you try and enlist?"

Pinky waved the soup spoon in a vague arc. "Around," he said. "Just about everywhere. I don't remember."

A light seemed to burst on Slim Harvey. "Let's look at your arm," he demanded.

Pinky laid down the spoon and pulled up a ragged sleeve. The soup was finished, anyway, and he felt better. Harvey peered at the skinny forearm and noted the droop of the hand at the wrist.

"Hell's bells, man," he sympathized. "They freaked you; and that let's you out. Gee, for a minute, I thought you was a spy. But a freak bomb can do anything. Don't you remember about it?"

"No."

"Don't know your real name or where you come from?"

Pinky's cheeks flushed to match his beard. "No," he admitted.

"Holy smoke! Amnesia and—" A bell rang faintly out where the machines hummed and Slim jumped up. "Come along," he said, "while I see who that is. You can have more eats later and bunk here tonight."

Pinky followed. He felt warm all over inside. It wasn't just the grub. He knew he'd found a friend.

HE DIDN'T KNOW until a minute later, that Slim had saved his life.

"It's Doc Buckley," the engineer explained after he had answered the audio call. "He's up in the lab and wants me for a while. So you wait right here in the engine room. And whatever you do, don't try to go outside the building."

"Why?" asked Pinky, innocently. Then hastily: "Of course, I wouldn't."

"There's a frequency barrier all around the building, Pinky. It's what dropped you on the stair. You'd be dead by now, if I hadn't hauled you in."

Slim was gone then through a narrow hall and Pinky sat on a bench near one of the machines to mull this over. Of course, with government research going on here, that's what they'd do. A lot of guards outside the fence would be a dead give-away to any enemy detectoscopes that might scan the area. But they couldn't see a freak barrier, and it was a sure defense against spies. Pinky whistled at the thought of his own narrow escape. If Slim hadn't been coming to the door just at that time, he'd have been shriveled up to a cinder by now. Lying in the frequency swirl for only a few minutes, would do it. You were helpless once they'd put you to sleep—unless someone like Slim was there.

The soup was taking effect. Pinky dozed off where he sat, lulled by the drone of the machines. He dreamed blissfully of signing enlistment papers and getting a uniform. Then suddenly he was awake with a start. Something had awakened him, something not right with one of the machines. It was groaning loudly, as if in pain or something. Pinky looked at the clock and saw he had slept for two hours. Slim wasn't back yet. Something was wrong, somewhere.

Pinky went near the groaning machine and saw a curl of smoke arise from a gadget at its end. Slim ought to know about this. Hobbling to the audiophone, Pinky tried to put through a call to Buckley's lab. No use; the thing seemed to be dead. He'd have to find Slim, himself.

He found him by instinct and by feel, at last. The halls and the stairs were in utter darkness, so it was a slow job. And when he did find Slim it was in a rubbish-cluttered corner, huddled in with a pile of junk, bound and gagged. Pinky went to work on the gag and had it off swiftly. He was worried about that sick machine.

"Slim," he said frantically, "I had to find you. One of those machines of yours is making a terrible noise. And now, you're like this. Who did it?"

"Never mind that machine," Slim whispered. "It's only an overloaded generator. It won't burn out. Get the knife out of my hip pocket and set me loose."

"Who did it?" repeated Pinky, getting the knife and sawing at the cord that held Slim.

"Buckley. He's a traitor, the skunk."

"A traitor!" Pinky had the engineer's legs free and was working

on the cords that held his arms behind his back.

"Yeah. Don't talk so loud or they'll be hearing us. There's a couple of guys with him I know are Allied agents. They're up to something. That's why Doc got me up here. To have me out of the way when they loaded up the generators downstairs. What they're up to, I don't know, but it's bad business. And we've got to stop it—somehow." Slim was free now and Pinky helped him limber up his arms.

"What can we do?" he whispered. A thrill, such as Pinky could not remember having ever experienced, ran through him. He'd manage to serve the United States, somehow, whether they wanted him or not!

"I don't know." Slim sounded sort of hopeless. "We can audio the military, for one thing, only that might be too late."

"Audio's cut off," Pinky told him.

"They *would* do that. Well, come along—let's see what we can do ourselves." Slim grabbed his hand in the darkness and they felt their way along to another stair.

At the head of this flight was a door under which a slit of light appeared. Behind the door was the sound of voices in monotone and the sudden keening scream of some mechanism coming swiftly up to speed. The scream held its high note for a second and broke off abruptly. A chorus of guttural exclamations followed.

Slim opened the door a crack and peered inside. "We'll sneak in," he breathed. "There's a transformer that'll hide us."

Pinky followed him and softly closed the door. From their vantage point behind the bulky transformer case he could see three men absorbedly regarding a large video-screen. Its news audio was off.

"The tall guy's Buckley," whispered Slim.

THIS was the main laboratory, a huge room with a great dome overhead and with all sorts of apparatus along the walls, in the center, and scattered here and there. Pinky looked around it and was amazed by the number and size of the queer-looking machines and by the gadgets that clustered around some, making them look like Christmas trees. His gaze returned to the man Slim had said was Buckley. Something tenuously obscure stirred in his memory as the man turned his head slightly. There was a certain familiarity to that aquiline profile. Buckley was talking to the two squat men with the close-cropped hair, in that thick, foreign tongue. That, too, was vaguely reminiscent of something.

"What're they doing?" breathed Pinky.

"Watch."

Pinky gave some attention to the large videoscreen and gasped at what he saw. The far-off pickup was sweeping a blasted, mountainous region. The Alleghenies! The front-line pill-boxes were here, the main strongholds which had held back the Allied advance for more than a year. The view shifted to the skies where a hundred V's of tiny light points could be seen approaching. A Q. A. fleet in battle formation! The view swept down again to the front lines and a dozen fans of pale-blue light lanced skyward. The men at the videoscreen were silent, tense; so were the two behind the transformer. The war was here, with them!

Buckley moved his hand to a lever and the silence was blasted by the blare of the news audio. Pinky jumped a foot and Slim hung on to him.

"—out 22Z and 23Y!" roared the military announcer. "Blackout sections 22Z and 23Y. Allied air forces advancing in this sector. American fleet and fan barriers rising to defense. But a few minutes ago there was a mysterious interruption to the fan barriers. Either something went wrong or the Allies have a new weapon. To prepare, orders are to blackout sections 22Z and 23Y. Blackout—"

Buckley grinned satanically as he flipped off the sound. The video continued. The American defense fleet was up with feeler-rays, springing toward the enemy. Cross-rays darted down. A burst of white flame enveloped an entire enemy squadron. Three American squadrons flared into sudden incandescence and were gone. But the enemy was almost at the fan barrier. They could not pass that. Unless—

There was suddenly, here beside them, that shrilling crescendo they had heard in the hall. If Pinky had jumped a foot before, he jumped six now. Every roseate whisker stood on end. His skin tingled from the electrification of the air. Blue flame lashed from a huge helix high in the dome. And when the screech of the frequency generator had risen to its peak and held it a second, those far-off fan barriers flicked into blackness. The enemy fleet was inside! The second line defense would have to take up the battle.

"Gee!" husked Slim. "That was done from *here*. What'll we do?"

Pinky had a strange stirring within him. He was thinking in a new and unaccustomed way. Things long forgotten were surging up from his subconscious. Not clearly at all, but pricking into the conscious.

"Wait," he told Slim. "Listen to what they're saying." The three at

the videoscreen were jabbering excitedly.

"Huh, who can understand that?" grated Slim.

"I can." Suddenly Pinky found he could understand the jargon. A little. Some words. Enough. It was amazing.

"You see!" Buckley was exulting. "I told you. We now have them inside. We will do the same with the second and third barriers and on every front. In a week, the war will end—with our victory."

"Suppose we are discovered before then?" one of the squat ones retorted.

"I have arranged," said Buckley. "The stupid fools of the American government will not suspect the great Dr. Buckley. Already, I have the permission to isolate here for ten days to complete what they think is to be the great new weapon. By the time they suspect, it will be too late—for them."

Pinky's wrath mounted. With each word he understood better. And other things besides the language he was remembering. Things—well, maybe this fool would not be so smart, after all. Maybe Pinky could find a way at last to serve his country.

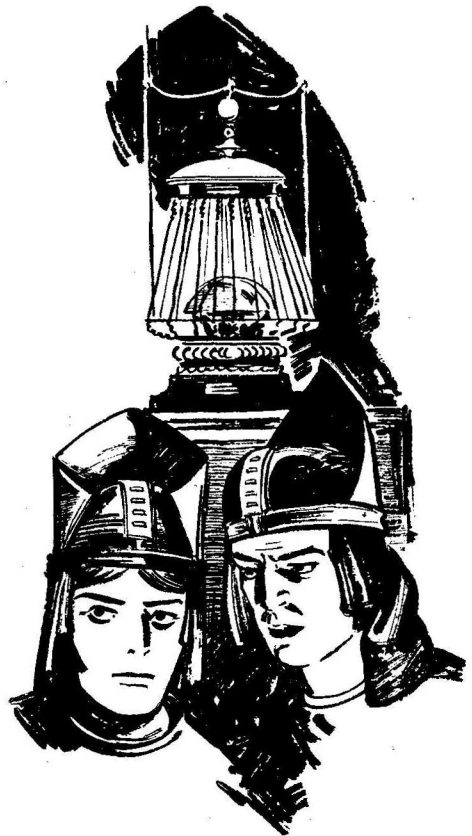
"What'd they say?" demanded Slim.

"Too much to tell, Slim. But they're planning to end the war from right here and have everything arranged. I think it is to be by what might be called a multiple frequency propagation—" Pinky's lower jaw dropped as he realized what he had said. Where had those words come from and what did they mean?

SLIM WAS equally incredulous. "Why, you . . . you seem to know something. Do you know what to do?"

Pinky passed a shaking hand across his brow to wipe away the sudden beads of perspiration that were dripping into his eyes. "Wait—wait," he begged. "It hasn't come, yet. But I'll know in a minute, maybe."

A terrific struggle was going on within his brain. He knew there was something to be done, something that was within his consciousness, but hidden. Something that was fighting to be out. Meanwhile, thousands of his countrymen were dying. The flashes in the sky and on the terrain beneath told him that. Why didn't they turn off the video so he couldn't see? The three over there at the controls were jabbering anew, but Pinky didn't listen. He was



sweating to listen to that small inner voice of his consciousness, trying to fish out something tremendously important.

"What can we do? What can anyone do?" Slim was whimpering now in horrified despair.

It was weird. Here everything was so calm and comparatively still. Out there, less than a hundred miles away, bloody warfare was raging. A country on its last legs was being wiped out of existence. And three men, only three, were doing it. Three against two, Pinky was thinking, and the three with many times those odds in their favor.

Fan barriers in the second line radiated upward. The American defense fleet was almost down in its entirety. Again Buckley reached for a control. The squeal of the generator keened toward the upper limit of audibility. Once more Pinky's whiskers bristled. And then he knew! He knew! He hugged the humming transformer case. It was the very transformer that hid them, the one supplying this energy. Its radiations were restoring memories. Of course. He grabbed Slim's arm with fingers that were suddenly of steel.

Slim winced and his eyes widened, looking into those of his companion. "Why . . . why, what the hell?" he gasped. "You're a different guy."

Pinky *was* a different guy. "We'll lick them at their own game," he grated. "You and I, Slim. And I know how."

"You do? How?" gasped the engineer.

"You've got to take a big chance, Slim. So've I."

"But, do you *know*? Are you sure it'll work?"

"It's a fifty-fifty chance. But I

think it will work. Are you game to risk your life with me?"

Slim gaped at the new Pinky. "Gee, if I'd have known what you had on the ball! You bet, I'm game."

Pinky gripped his hand and whispered, "Thanks. And trust me, Slim. Here's what I want. I'm going to sprint for those controls back there. They're bound to see me on the way unless their attention's distracted. It's up to you to do that."

"How?"

"By staying right here and yelling. Let them start this way and begin their shooting. But keep under cover as much as you can. Once I get to those unused controls, I'll have them stopped."

Slim's eyes bulged. "How'd you know what—"

"Never mind that now. Still trust me?"

The engineer looked long and hard at his erstwhile guest and what he saw convinced him. "Yes; say the word."

Pinky peered around the corner of the transformer, seeing that their three enemies were absorbed in the videoscreen. "I'm going to crawl," he whispered, "for ten feet. They probably won't notice at first, but when you see me that far, it's time to start yelling. I'll do the rest."

"Go ahead. Shoot," husked Slim.

Pinky started crawling into full sight of the three, at right angles to their line of vision. Ten feet away was another transformer. Fate was against him; one of the squat aliens spied him before he reached it. Gutturals rolled forth and a hissing, stab-ray scorched across Pinky's neck just as Slim commenced yelling. Pinky leaped to his feet and scooted for his controls. Forgetting caution, Slim came out of hiding.

"BUCKLEY, you crook!" Slim screamed, plunging directly into the line of fire. "You traitor! You're finished!"

Momentarily confused, the enemy began blazing away wildly. A searing pain stabbed through Pinky's shoulder as he zigzagged toward his destination. From a corner of his eye he saw Slim fall with dungarees smoldering. Six more feet and he'd be at those controls. One of the squat ones was almost on him. Pinky lashed out with a suddenly strengthened right arm. The man sprawled, mouthing thick curses, his ray pistol clattering to the floor. Pinky grabbed the gun and a control knob in sweeping opposite motions of his two rejuvenated arms. A fluorescent green blazed eerily down from high in the dome as a bank of old, dusty vacuum tubes lighted. There were no further hisses of stab-rays.

Bellowing encouragement to Slim, Pinky brought down the pistol butt on the clipped head of the one who had dropped it. *Crack!* One of the three was out of the fight. Odds were even. And those radiations from the dome had neutralized the energies of the ray guns.

Pinky catapulted across the floor at Buckley. The renegade doctor was tripping the release of his gun frantically. Disgusted at its refusal to operate, he foolishly flung it away just as Pinky landed on him. That mistake cost him any chance he may have had, for this raging rebeard wasn't fighting by any sporting rules. Not now. Not in this. Pinky was fighting for his country and no holds, or anything else, barred. He smashed down the pistol on Buckley's skull and the man sank down.

Slim had not been so fortunate. His opponent had him tied in a knot on the floor. Pinky went to help.

"Go 'way!" shouted the engineer. "I'll get this bird, myself. I'll break his dirty neck."

Slim almost did just that, though he was bleeding and panting when he rose and swayed groggily over the prostrate foreigner.

Pinky chortled and said: "Good work."

"Think I'd let you do everything?" Young Harvey glared, wiping the blood from his mouth. "And now, dammit, you've got to tell me all about everything."

"When we fix them up for a while, Slim." Pinky pointed to one of the three who was stirring. "Where's some cord or wire?"

It didn't take them long to truss up the precious trio and lay them side by side on the floor. When they had finished, they examined one another's wounds. Pinky had a clean hole burned through his shoulder, missing the joint entirely. Slim's burn was horribly deep, a crinkled, white-lipped groove across his middle. Painful, both wounds, but self-cauterized. That was one good thing about the stab-rays; unless they reached a vital spot, there was little real danger.

"Well," said Slim, when they'd finished, "come clean, now. All the way. You faked the amnesia, didn't you? And the paralysis?"

Pinky shook his head and Slim could see that his eyes had lost the far-away look and the pallid hue. "No, I didn't fake anything, Slim. The radiations from that transformer restored my memory and the use of my limbs. That's all."

"It isn't all. How about knowing about this?" He jerked a thumb upward toward the green flare that was still on.

Pinky laughed and went to switch it off.

"ALL RIGHT," he agreed, when he came back, "I'll come clean."

Slim was goggling at the video-screen. The enemy fleet, caught between the second and third barriers, was being blasted out of the skies by the reserve American fleet and by the searching vibro-rays from the ground.

"Too bad their plans went wrong," chuckled Pinky. "Oh, the war'll be over in a week, all right, just as Vardos said. But the victory'll be ours, not theirs."

"Vardos?" asked Slim, blankly.

Pinky indicated the unconscious one Slim had known as Buckley. "He's not Buckley," he averred. "Name's Vardos. He was assistant to the real Buckley a couple of years ago. Started just before the war did. And he knew the real doctor had something that would make this country invincible in warfare. His job was to get the dope on Buckley's weapon. And he rayed Buckley with the same frequency radiated from the regular bombs. Left him to die in the swirl. Once Buckley was out of the way, he tried to discover the secret of the weapon. But there were a few things Buckley had kept in his head, so it took Vardos until only recently to learn the important activating tie-in. That's why he demanded and got the isolation. It took time—for him. He doesn't know a thing about the rest of the apparatus here. That's why he didn't know what I was up to when I ran for those controls. None of the other stuff in here has been used since Buckley, himself, went out of the picture, only the main thing—the multiple frequency propagation mechanisms."

"But how could—"

"There was enough similarity between Vardos and Buckley so he could get away with the impersona-

tion. It was easy, with a little make-up—even with the military. Also, on account of the reputation of the real Dr. Buckley, who was always a staunch patriot."

Slim's brown eyes seemed about to pop from their sockets. "But you—then you—"

"Yes, I'm Francis Xavier Buckley, if that's what you're driving at. Naturally, I knew about things here when I remembered. And, incidentally, Vardos rayed me right here and sneaked out, leaving me in the wave swirl. But I managed to crawl out of it and away before it could kill me and consume me, as it always does if given enough time. He thought that was what happened. But I was the wandering, mentally lost, partly crippled Pinky you first saw. You see, the frequency used by him and in what we call freak bombs, acts first on brain and nerve cells. Electric charges are built up in individual cells, first producing unconsciousness, then paralysis, by implantation in the nerve ganglia. A definite multiple wave harmonic will release those charges and cure the sufferer. That's what happened to me behind the transformer. It took two shots to do it. But it's done. It was sheer luck I stumbled into the old cottage. Luck, or a buried remnant of familiarity and memory."

Slim was dancing around him, trying to hug him. "Gee!" he kept repeating awedly.

"Ouch!" yelled the man who had been known as Pinky. "Keep away from that shoulder. And let me finish. Might as well get it off my chest now."

"I'm just a punk operating engineer. I wouldn't know," apologized Slim.

"Yes, you will. It's simple, the principle of the multiple frequency

propagation. You know that all modern weapons and defenses are dependent for their effectiveness on some sort of radio frequency projection. Various high frequencies produce various results. And for many years man tried to neutralize various destructive effects by superimposing frequency upon frequency. It was done in some cases—like the stab-ray. But to bring stratoplanes down or to stop fan barriers or trench moles, complex radiations were required. That's how I developed the multiwave apparatus. It produces a great number of individual frequencies separated in definite multiples between which there are heterodyning effects which result in an infinite number of beat notes to cover any result desired. Vardos only found the one combination which could close down the fan barriers and permit the Q. A. fleet to drive through the space where formerly an electronic wall had been erected. It happens to be the same combination which will release the cell charges in a sufferer such as I had become. Simple enough, isn't it?"

"It isn't," Slim said decisively. "But it'll have to do. So now what?"

"So now we can produce any combination of harmonics we want. We can render powerless the enemy

fleets and their ground forces and blank out their defensive barriers. We have them licked."

"You mean *you* have them licked." Slim looked his companion up and down with approval. "You sure are a different man, Dr. Buckley."

The real Buckley grabbed his arm. "Listen," he laughed, "until I get these whiskers off, you call me Pinky. You hear?"

"All right—Pinky," chuckled Slim. "And what do we do next?"

"We go down to your bailiwick and feed me those sandwiches you told me about. I'm hungry. Then we audio Regional Headquarters and have these babies picked up for quick trial. I imagine they'll look nice under the cone swirls they use on spies."

Vardos was stirring, groaning, muttering curses. His eyes widened with horror as they rested on the man who was the real Buckley. Even with the pink disguise, he recognized him.

Pinky turned away and said to Slim: "Let's go downstairs. I want to juggle a pair of shears and your razor before we get the military on the job."

"O. K., Pinky," grinned the engineer. "And the eats."

"I Talked with God"

(Yes, I Did—Actually and Literally)

and, as a result of that little talk with God some ten years ago, a strange new Power came into my life. After 43 years of horrible, sickening, dismal failure, this strange Power brought to me a sense of overwhelming victory, and I have been overcoming every undesirable condition of my life ever since. What a change it was. Now—I have credit at more than one bank, I own a beautiful home, drive a lovely car, own a newspaper and a large office building, and my wife and family are amply provided for after I leave for shores unknown. In addition to these material benefits, I have a sweet peace in my life. I am happy as happy can be. No circumstance ever upsets me, for I have learned how to draw upon the invisible God-Law, under any and all circumstances.

You, too, may find and use the same staggering Power of the God-Law that I use. It can bring to you, too, whatever things are right and proper for you to have. Do you believe this? It won't cost much to find out—just a penny post-card or a letter, addressed to Dr. Frank B. Robinson, Dept. 9, Moscow, Idaho, will bring you the story of the most fascinating success of the century. And the same Power I use is here for your use, too. I'll be glad to tell you about it. All information about this experience will be sent you free, of course. The address again—Dr. Frank B. Robinson, Dept. 9, Moscow, Idaho. Advt. Copyright 1939 Frank B. Robinson.

LUNA OBSERVATORY No. 1

An observatory on the moon would be fine! But—why? And what would it need? And what would they study? A professional astronomer examines the question from a practical side.

By R. S. Richardson

Illustrated by Schneeman

A FULL-SCALE astronomical observatory is one of the few really expensive things in the world that can be guaranteed not to make money for those who invest in it. Even cyclotrons look now as though they might turn into money makers, what with the artificial radioactive elements they're making, though a few years ago they seemed a pretty good bet as a one hundred percent no-return investment.

Yet, for some reason, probably rather nonunderstandable to those to whom money represents not only a good, but the only, measure of accomplishment, men are found to build them. Other men are not only willing, but anxious, to spend years planning for them. And it does mean years of planning, analyzing the faults of all that have been built, trying to see some way out of not only any given fault, but all known, and possibly as yet unknown, faults.

One of the greatest of all faults in known telescopes and observatories is the location of the observatory. Without exception, they have been placed in extremely bad positions, under circumstances that vastly hinder them, reducing their effectiveness to not more than about thirty percent of their theoretical maximum. They've all been built on Earth. It's

unfortunate, but until we get away from that factor of bad location, we're going to continue to "see through an atmosphere, darkly."

It's also unfortunate, even more so, that we can't as yet build one beyond Earth's atmosphere—on the Moon, say. But the men who first set out to undertake that task are going to face some magnificent problems, and not mere years, but decades, of planning will be needed to solve them.

What are some of these problems? On what factors will success depend? Can we guess at its general design and, equally important to its effective use, its administration?

These questions can be answered in two ways. One invokes the free and unhampered use of imagination, together with an implicit faith in the powers of future generations to go on conquering nature. Then, with materials of infinite strength, and unlimited sources of energy and machines that, defying nature, are absolutely accurate, we proceed to erect a structure according to the dictates of our fancy. This method is the one commonly employed in science-fiction, where it is perfectly legitimate. But for an article, it is a bit too inflationary—too much like playing poker with a pinochle deck. There-

fore, in our attempt to describe conditions in the future, we shall be guided by what has been most successful in the past, and try to keep our speculations within at least reasonable bounds.

Let me add also that we shall be concerned only incidentally with such matters as methods of transportation, design of spacesuits, et cetera. These are of vital importance but they are separate problems, outside the present discussion.

The creation of a great observatory can generally be divided into four overlapping periods.

1. Somebody gets a powerful urge to build a telescope surpassing any in existence.

2. After thinking it over he decides to go ahead and build it, either by doing it himself (Herschel, Lord Rosse, Lowell), or by persuading someone else to finance the project for him (Hale).

3. Having received assurance that the instrument he has in mind can actually be built, a site is selected with the greatest care, a general program of research outlined, and engineers set to work designing the telescope and its accessories.

4. The director gathers together men of proven ability, who can get the maximum results from powerful instruments of the highest quality. They aid him in establishing the observatory and in carrying out his program of research.

Naturally, many variations are possible, and events do not always follow in such logical order. But the development of most big observatories can usually be broken down into these four steps. Notice that three of them are preliminary in character. This is as it should be, for the whole general tone of the institution, its future format so to speak,

is largely determined right at the start, before ever the ground is turned or a bolt driven.

PROBABLY the most important factor of all is the personality of the founder himself. He should be a man of enormous will power, determination, and enthusiasm for his work. This enthusiasm he must be able to impart to others and inspire them with the same fervor that animates himself. It is here that most of our "pure" scientists fail to qualify so miserably. And I have no hesitation whatever in placing them clear down at the bottom of the introvert class. I make no pretense to a knowledge of psychology, but I think expert opinion would back me up on this.

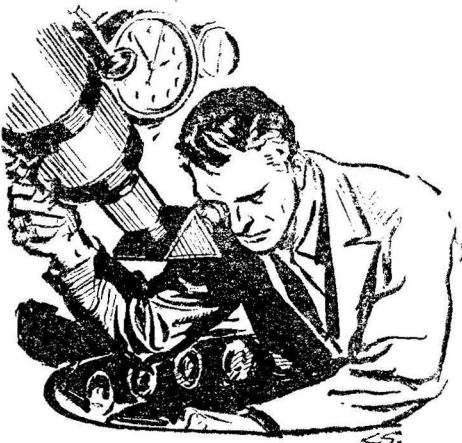
And astronomers are among the worst of the lot. They are great people to quibble over details, to view with detachment, and to subject to analysis. They shrink from the rough-and-tumble, thick-skinned, try-and-get-it attitude of the commercial world. But these are the conditions that must be faced to raise the money for a research institution and keep it functioning smoothly. Therefore, our chief of staff must be a man who not only can dream dreams, but one who can make them come true as well. He must have the knack of persuading captains of industry to dig into their pants pockets for millions, and also take the keenest interest in the light from the farthest star.

The ideal director would be a man like the late George Ellery Hale, who founded the Yerkes Observatory, the Mount Wilson Observatory, and the one now going up on Mount Palomar. Like most geniuses he began when comparative young—at the age of twenty-four, to be exact. When most budding scientists are

worrying about their doctor's oral, and wondering if they can find a position with enough salary attached to it to get married on, Hale had already secured the money from Mr. Charles Yerkes to finance the construction of that observatory.

Evidently Hale got plenty of experience at this time in raising money for science, for after the telescope and main buildings were completed, hardly anything remained for current expenses. Once, in making a spectroheliograph, they ran so short of funds that instead of buying a lens from an optical company, they had to shop around for it, finally picking one up in a pawnshop in St. Louis.

Practically all of the big observatories in this country have originated in this way—from the gift of a wealthy man to a university. The university promptly names the observatory after him, and supports it out of their own funds, special gifts and endowments. The Lick Observatory is a branch of the University of California, the new Macdonald Observatory belongs to the University of Texas, and the 200-inch was a gift from the Rockefeller trustees to the California Institute of Technology.



AST—8

Lowell and Mount Wilson are the only large active observatories that come to mind not connected with some university. The former is financed through a trust fund left by Percival Lowell, while the latter is a department of the Carnegie Institution of Washington, D. C. For some reason, people almost invariably assume that Mount Wilson is run by the Federal government. The letters "C. I. of W." on the observatory truck often lead people to inquire if it is part of a work-relief project of some kind.

Here someone might argue that the government would be the ideal sponsor for our observatory. Perhaps in the future, in a society widely different from ours, this may indeed be true. But at present it seems rather unlikely. A glance through the annual reports of the United States Naval Observatory will show the reason why. The trouble lies in demonstrating that an astronomical observatory is of value in connection with a basic function of government; that is, a Federal bureau must in some way "promote the general welfare." And even its most ardent supporters would doubt whether a congressman could be convinced of the pressing necessity for measuring the intensities of interstellar sodium lines, or darkening at the limb in eclipsing variables.

The results show, then, that observatories thrive the best when founded by a grant from a powerful philanthropic organization, controlled by a university. Let us hope that its officers and trustees will be liberal, farseeing men, always receptive to new ideas and eager to cooperate with the staff, yet slow to proceed upon a new course until all the facts are in, and carefully weighed in the balance.

HOW MUCH MONEY will be needed? Detailed figures on the different parts of an observatory are hard to find, and expenses will naturally vary widely with the times. The total cost of the 100-inch when completed in 1917 was \$540,000. In 1926 one expert estimated that a 300-inch could be built for \$18,000,000, and it is understood that the California Institute must stay within a budget of \$12,000,000 on the 200-inch. The latter includes not merely the big mirrors and dome, but the accessories and dwellings, too—such as the “Lamasery” where the astronomers will stay while on Mount Palomar. (They claim everyone is so happy up there that it’s just like living in the land of Shangri-La.) But our expenses will be so unusual and on such a different scale, that we should at least ask for \$100,000,000 for the first extraterrestrial observatory, which would be a very generous grant as scientific grants go, but still quite moderate compared with the price of a few battleships.

Operating expenses of an observatory depend primarily upon the size of the staff and the liberality of the trustees in giving the astronomers money for the various gadgets they are always inventing. These range from automatic guiding devices that ring a bell when a plate is properly exposed, to interferometers for detecting planets revolving around the stars. Mount Wilson, with a staff of twenty-one astronomers, fifteen assistants and computers, sixteen mechanics, and ten clerks, got along in 1937 on a budget of \$217,081. Our extraterrestrial observatory will undoubtedly need a larger “ground crew,” and the demands for special equipment will be heavier.

By far the biggest item will be for transportation, something comparatively insignificant today. The

operation of a big telescope is a relatively easy matter requiring one or two men at the most. It is the overhead, and the money spent on men and women who never look at a star, that swells the budget. Perhaps \$5,000,000 would not be too much to keep the machinery running throughout the year.

WITH the financial end of our project disposed of, let us now look over the Solar System for the best site available. Here we are confronted at the very outset by the fact that we don’t know how fast the spaceships of the future can travel. In science-fiction we have become so accustomed to spaceships flitting from planet to planet that we accept it as a matter of course, a commonplace almost. Whereas Jules Verne used up half a book getting his characters off to the Moon, the trip is now made in a paragraph or two. If spaceships can attain a speed of 50,000 m. p. h., then one location is possible. But if more reasonable velocities of the order of 3,000 m. p. h. are the limit, then our only choice is the Moon. The desirability of establishing an outpost on an airless world more distant than the Moon is not immediately obvious, and is worth explaining in a little detail, since it lies at the bottom of the whole matter.

The fundamental purpose of an extraterrestrial observatory is to get rid of the air currents in the Earth’s atmosphere that blur the image, and secure a sky absolutely black. A telescope on the Moon would eliminate the first and worst of the astronomers’ foes, but the sky would still not be one hundred percent black because of the zodiacal light.

On Earth the space penetrating power of a lens or mirror is limited by the sky fog that begins to show

when an exposure runs too long, even when no artificial light is near. This comes from three sources in the following amounts: fifteen percent permanent aurora, twenty-five percent scattered starlight itself, and sixty percent zodiacal light. We rid ourselves of the first two as soon as we get beyond our atmosphere. But we are forced out to one of Jupiter's satellites to avoid the last. At the minimum, this would mean a journey of 390,000,000 miles, and to make it in a year requires a speed of 44,500 m. p. h.

Instead of regular trips back and forth at short intervals, the staff would have to live on some isolated world permanently, and it is very doubtful if many married men would take the job. There would be an advantage in having such an observatory, however, because of the longer baseline available for stellar parallax work. At present hardly any stars are left with parallaxes large enough to be measured by the direct trigonometric method.

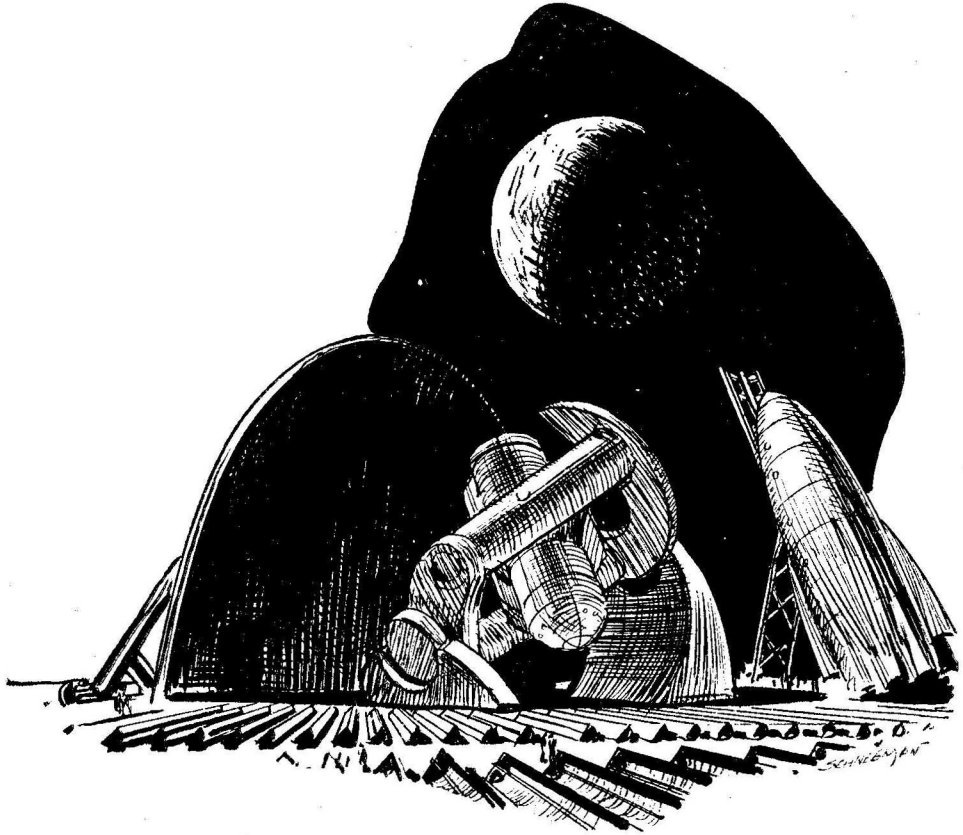
THE MATTER of distance, then, forces us back to the Moon, which, after all, is not such a bad location, especially for the first one. At a velocity of 3,000 m. p. h. the journey would take only eighty hours, certainly a decided convenience. The Moon is a world of respectable size, yet so light that its surface gravity is but one sixth of the Earth's, which would be of tremendous help in working under highly uncomfortable conditions.

The main difficulty anticipated is from the meteoric bombardment to which the men and instruments are constantly exposed. This is so important that the chief purpose of the first expeditions would be to make a report on the statistics of meteor fall, just as men with small

telescopes are now sent out to tentative sites to scout the seeing conditions. Counters would be set up near the spaceship automatically recording the number and magnitude of the impacts received during the day. Only in this way could we determine whether the Moon could even be seriously considered as a location for an observatory. If the danger is insignificant, then operations could be started at once for the underground living quarters, machine shops, and storerooms. Once these were well underway, the success of the enterprise would be practically assured.

The absence of an atmosphere also simplifies matters in that there would be no point in putting the telescope on a mountain peak, as we are compelled to do here. On the contrary, some smooth plain would be selected where supplies could be easily unloaded, taking care only that the horizon is unobscured. Since we would want to keep in communication with the Earth, Selene I would be on the side of the Moon that always faces us. To see the entire sky the site should also be near the lunar equator. The Mare Tranquilitatis just north of the crater Maskelyne might be suitable, which is close to the Equator and superficially smooth, judging from its telescopic appearance.

It would be of the utmost importance, especially in the early experimental stages, that a two-way communication system be established at once. There appears to be no reason why this could not be done by radio, rather than a code of light flashes, for example. Reflection of radio signals from the Moon is possible right now, according to J. H. Dellinger, radio chief of the National Bureau of Standards, so that there should be no difficulty in the future.



The two principal requirements for interplanetary wireless communication are that the signals be broadcast on a frequency sufficiently high to pierce not only our own atmosphere at the angle of incidence used, but that of the planet's as well. The highest critical frequency for the ionosphere at vertical incidence varies from 6,500 kc at sunspot minimum to 12,000 kc at maximum. A planet closer to the Sun than the Earth might have an atmosphere more highly ionized than ours, which would necessitate the use of higher frequencies than these. But for airless bodies like the Moon and Mercury, the difficulty does not exist. It is interesting to note that signals have already been received from outer space after a delay of four and

three tenths minutes, which happens to correspond to the distance of Venus when at inferior conjunction. Interplanetary radio looks possible.

IN THE OPERATION of terrestrial observatories, the source of power has always been a problem. By necessity they are located on a mountain peak or plateau far from large centers of population. This means that power must be transmitted over long distances or else generated on the spot—a costly proceeding in either case.

On the Moon, however, we would be foolish not to take advantage of the vast supply of energy that is ours for the asking. For two weeks the Sun is shining in a sky unstained by clouds or haze. What could be

simpler than to make the Sun do our work for us?

This could be accomplished by solar engines similar to those now in operation on a small scale by C. G. Abbot of the Smithsonian Institution. They would consist principally of parabolic mirrors continuously turned toward the Sun by mechanical means, which reflect light onto blackened tubes, or boilers. The steam generated would be used to run a small turbine that drives a direct current generator. Banks of large storage batteries would conserve the energy needed to operate the mechanism and provide power during the long lunar night. Internal combustion engines would be out of the question owing to their high consumption of oxygen.

In addition to running the machinery, the generator would also supply current to heat the bearings of the various instruments, which otherwise would freeze up immediately. No lubricant can work satisfactorily at a temperature of minus one hundred degrees Centigrade.

Several locations for the telescope are possible, but after lengthy consideration it has been decided to put it out in the open. No mammoth dome of the type required on Earth would be necessary, since there is no need to guard against wind and rain. But adequate protection would be necessary against the scorching rays of the Sun and the impact of meteors.

The former would be provided by a heliograph on which is mounted a screen, moved at such a rate that the telescope is always in shadow. This screen could also be readily raised or lowered, or run by moving wheels to any desired position on the concentric circular tracks provided for it.

As a protection against meteors it is proposed to inclose the entire instrument with three coats of armor separated from the telescope tube itself by a space of several feet. These coats would have no connection with the telescope or its driving mechanism. Since they have to absorb the shock of impact they cannot be mounted too rigidly but must have a certain degree of "give" to them.

A most interesting point is that in dealing with meteoric velocities of the order of 20 m. p. s., a heavy metal such as lead would afford more protection than material of high tensile strength, such as steel. The reason being that when a force acts very quickly the inertia of the reacting substance is of more importance than its hardness. This may be shown by suspending a heavy ball from the ceiling by a string with another string attached underneath. A strong steady pull on the lower string will break the one above. But a sudden jerk will cause the lower one to snap, because the force acts so quickly that the upper string is momentarily protected by the inertia of the heavy ball. The analogy here is far from perfect, but perhaps it conveys the idea. The two inner coats could be of steel to stop meteoric iron and exploded particles from the outer coat, since their velocity would be greatly reduced after the initial collision.

These concentric shields should extend so far beyond the mirror and its mounting that the opening in the sky is nothing but a tiny hole. A meteor would then have to be moving almost straight toward the mirror to score a hit—an event which the statistics gathered on meteors must first have shown to occur at intervals long compared with the probable lifetime of the telescope. Oli-

vier estimates that a million meteors strike the Moon daily. On this basis, one would hit an area twenty-five feet in diameter on the average of once in thirty years. And since only those moving directly toward this area are effective, this interval should be extended to several centuries.

Now for the telescope itself. The size of the mirror would appear to be limited chiefly by the question of transportation. In the opinion of experts, at present anything can be built up to a hundred feet in aperture—provided one has the money to pay for it. We will be conservative on our maiden venture, however, and start out with one of twenty-five feet, or three hundred inches, in aperture.

We have already assumed that interplanetary communication has been realized, hence there seems to be no point in designing a telescope to study the members of our own system. Like the 200-inch, it would be intended primarily for stellar work and exposures of faint nebulae. This calls for a tremendous concentration of light to keep the exposure times down. The 200-inch is to have a ratio of $F/3.3$. Suppose that we go a little further and make the eye of Selene with a value of $F/2.0$, giving a principal focal length of six hundred inches.

At this point I can hear someone object that the field of view with a mirror at $F/2.0$ would be so restricted as to make it virtually useless. This also was one of the problems encountered in connection with the 200-inch. In a telescope of short focal length only the stars near the center of the field are round and sharp. A little outside of this limited region they begin to be egg-

shaped, with the smaller end pointed toward the center. The effect is known as coma, and if the star field is fairly large, can be very troublesome.

Opticians have long known how to correct a telescope for coma, but to do it in practice is another story. The Ritchey-Chrétien reflector recently installed at the Naval Observatory is one way to get around it, and the Schmidt camera is another. Unfortunately, neither of these schemes is suitable for our particular use.

The difficulty has been finally overcome by Dr. F. E. Ross of the Yerkes Observatory, who has produced a correcting lens which, when placed in the cone of rays just in front of the plate, gives a large field free from coma. Ross lenses are now in use at $F/3.3$, and in his latest report he says he thinks he can also make them work at $F/2.0$.

The mounting would be of the equatorial yoke type used on the 100-inch and in a slightly modified form on the 200-inch. This style of mounting combines great stability with remarkable ease of operation. We would see to it, however, that one feature of the 100-inch mounting is not included. It is not generally known that the 100-inch cannot be pointed farther north than seventy degrees, which means that if a nova flashed out within twenty degrees of the pole, the astronomer there would just have to stand and look at it.

THE IDEAL substance for the mirror would be an alloy which might be called *Mirrorite*. It would consist of metals having the reflecting power of silver, the zero coefficient of expansion of invar, the freedom from tarnish of stainless steel, and the

lightness of magnalium.* Until such a remarkable substance has been found, we will have to remain content with a single block of glass of first quality having a high quartz content, and coated with aluminum.

Observations would be taken from air-tight compartments within the telescope tube itself. One would be in the form of a capsule six hundred inches above the mirror at its principal—Newtonian—focus. In this way the light is focused directly onto the plate with a single reflection. Rather curiously, this system can be used to advantage on a small reflector and a very large one, but not on one of moderate size.

The 36-inch Crossley reflector of the Lick Observatory has the plateholder mounted at the center of the tube within arm's reach of the astronomer on a platform nearby. But the 60- and 100-inch reflectors are so big that it would be almost impossible to get at a plateholder this far away without grave danger to the mirror—and incidentally—to the observer himself. On the other hand, a central observing booth would take up too much room.

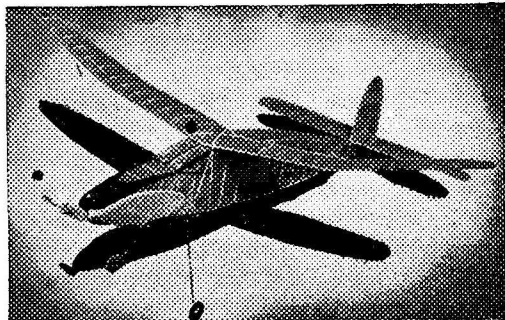
Therefore the beam has to undergo a second reflection with more loss of light to the plateholder on the side of the tube. A 300-inch mirror, however, has ample aperture to accommodate an observing chamber within the tube without causing a serious loss of light, since the areas go up as the square.

The other observing booth would be at the lower Cassegrain focus immediately below a small opening at the center of the mirror. Light reaches it from small convex mirrors housed within the capsule at the Newtonian focus, and compactly mounted so as to be easily turned aside when not in use. Three con-

* An alloy of 31 parts magnesium and 69 parts aluminum.

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vex mirrors would be available, giving longer equivalent focal ratios. In addition, a third mirror system would reflect light down the hollow polar axis to a constant temperature laboratory far underground. Very long focal lengths are possible with this so-called Coudé form of mounting, of the order of F/30 or more. The big advantage here is that the beam always comes from the same direction, making possible the use of a stationary spectrograph of high dispersion, instead of a small one clamped to the telescope.

The central capsule at the Newtonian focus would also be an enormous time saver, in that it does away with the clumsy cages to which the auxiliary mirrors have always been attached heretofore. At the 100-inch it takes several hours to switch from the Newtonian to the Cassegrain form, or vice versa. Often the poor night assistant, after getting to bed at five in the morning, has to toil all afternoon getting the cages into position for work that night, and then report back for duty at seven in the evening.

THE HUGE MIRROR might be likened to a sun surrounded by a satellite system of minor instruments and accessories. Frequently a small telescope can do some job even better than a large one, on the same principle that an elephant gun isn't necessary for hunting rabbits. Cases continually keep coming up in which it is desired to make a quick survey of a large portion of the sky.

A few years ago the Carnegie Institution wanted to make a mosaic map of the Milky Way by fitting separate photographs together. The 100-inch with its small angular aperture would have been at a big disadvantage. Consequently a spe-

cial photographic lens was used that gave photographs of the sky twenty degrees in diameter at one shot.

Similarly, for the systematic investigation of supernovæ, a powerful wide-angle telescope was the best bet, capable of photographing large areas of the sky with great speed and uniformity. For this program an 18-inch F/2 Schmidt was put on Mount Palomar where it has been in operation since September, 1936. By January, 1938, over three thousand nebulæ had been searched and three supernovæ discovered with this little instrument, that looks like a hen house beside the 200-inch dome.

Often, too, a small device attached to the big mirror will speed it up tremendously. The photography of the spectra of faint extragalactic nebulæ had astronomers worried not so long ago, for it began to look like the number within reach of the 200-inch would be much smaller than had been expected. Perhaps a telescope of larger aperture should have been attempted. Then someone got the idea of trying out a Rayton short-focus camera lens in the spectrograph. One at F/0.59 was found to cut the exposure time down at the 100-inch by a factor of eight—immediately opening up new depths of space for exploration at a negligible cost.

WHILE OPERATIONS are going forward on the Moon, the computing staff at the home office will also have plenty to keep it busy. For one of the first things the astronomers will need are tables to reduce star positions determined on the Moon from one date to another. The Moon's axis of rotation describes a circle three degrees in diameter around a point in the heavens near

the fifth-magnitude star 36 Draconis, once every eighteen point six years. The result is to make the stars continually shift their apparent positions in the sky—hardly enough to be noticed by the eye—but by amounts intolerable for the crudest sort of astrographic work.

The Earth's axis has a similar motion around the same star, only in our case the circle is described in a period of twenty-six thousand years, and has a diameter of forty-seven degrees. This is the famous precession of the equinoxes, and is the reason why star catalogues always have to state the year to which they referred, as otherwise the star positions would be of little value. Since the rate of the motion is accurately known, the co-ordinates of a star can then be found for any date before or after. The calculations are quite simple, but if done in a hurry a mistake can easily slip in.

Many times an astronomer has measured the position of a comet or asteroid with reference to the fixed stars nearby, and in his anxiety to publish his results, applied the reduction for precession with the wrong sign. This is always embarrassing, for it will invariably come to light later on, when the comet's orbit is accurately known, and his positions stand out in glaring contrast to those of everyone else concerned.

On the Moon this motion of the pole is much faster than for the Earth, but smaller in amount. If it were very fast, the stars would keep constantly drifting out of view in the telescope, regardless of how accurately it was mounted. The effect could be overcome by strenuous guiding, or by a driving mechanism that allowed for it. But it would be a nice problem figuring out a set of

gears to follow such a motion, especially when we consider that it doesn't even have the grace to proceed uniformly.*

Otherwise, the celestial sphere would behave about the same as it does here. Stars would still rise in the east and proceed across the sky toward the west, but at a rate more than twenty-seven times slower than on Earth. Constellations in the northern and southern hemispheres would generally correspond to the same ones we are accustomed to seeing there. The complex path of the Moon in space would not make the slightest difference in the positions of the stars. The only thing that can affect them is a shift in direction of the Moon's axis with respect to some fundamental plane of reference, such as that described above.

Peering ahead, we can see the astronomer of tomorrow making routine trips back and forth between his comfortable office on the Earth, with its computing force, library, and lecture rooms, and the observatory itself on the Moon. Consulting the program on the bulletin board, he finds himself down for two weeks at the 300-inch beginning the first of the month. Then he is transferred to the Schmidt, while Hicks goes on at the 300-inch. He also notes from the daily lunar report that old Doakes is still fooling around at the 50-inch with that photometer of his. Well, guess he'd better get packed tonight and make sure his spacesuit is O. K. Ho hum. Tough luck having to spend a month on the Moon with those two bores.

* The cause of this lunar motion is hard to explain without getting technical about it. Briefly, it arises from the peculiar circumstance that the pole of the Moon's orbit, and the pole of the Moon's equator, both revolve around the pole of the ecliptic so that all three keep in a straight line, with the pole of the ecliptic in the middle.

BOMBARDMENT IN REVERSE

*Even the best of military men get confused
about locating guns when they're fired from
two miles away in the middle of next week.*

By Norman L. Knight

Illustrated by M. Isip

The following narrative is an excerpt from "Galactic Chronicles," a monumental work on extraterrestrial history by the Earth-born Martian historiographer, Irai the Younger, who flourished about 2600 A. D. He regards the tale as of doubtful authenticity and is inclined to classify it as merely an interesting legend. It is hereby reproduced as no more than that.

ALONG the outer reaches of an obscure star cluster in the constellation of the Swan there revolves a planetary system, one of the worlds whereof is known to its inhabitants as Dzorán—but this fact is of little moment, inasmuch as in their tongue the name signifies simply "the world." In truth, neither the name of the world nor the speech of its dwellers may be accurately represented on the printed page, since the vocalizations of that peculiar race defy recording in all available systems of phonetic symbols. Therefore all names of persons and localities hereinafter referred to must be construed as mere approximations. Such things as numbers and units of measure are translated in terms of familiar equivalents.

The Dzoránians are erect biped beings provided with a pair of tentacular arms—and beyond that they bear little resemblance to either man or Martian. Due to the low density and feeble gravity of their planet—

about four fifths that of Mars—they are devoid of skeletons either internal or external, being as boneless, flexible, and elastic as terrestrial gastropods. A rudimentary calcareous dorsal shield bears witness to their mollusoid ancestry.

The Dzoránian epidermis is dyed an emerald-green by cells of pigment akin to chlorophyll, but of a photosynthetic activity enormously more rapid in its functioning. Whether the possessors of this useful integument should be considered as animal or vegetable beings is a debatable point. They derive sustenance from their highly carbonated atmosphere, from the radiations of their binary sun and from imbibing the mineralized waters of their world. The life cycle of each individual begins as a seedlike embryo, incased in a horny shell the size of an orsil melon, which needs must be planted in suitable soil for its further growth.

Now at the time of which we write, the entire world of Dzorán was divided into two empires, Estragon and Nyandra, which long had been upon terms of mutual tolerance. This happy state of affairs was disturbed by an act of the Estragonians, who proceeded to drain a swamp which lay along the borders of the empires at a point where the



"By means of the belt," he said, "I will go into the future a bit." Whether that was where he went or not, he went elsewhere or elsewhere—

common boundary had never been carefully surveyed or clearly defined. The Estragonians laid claim to the fertile land for their hothouse nurseries.

This claim was not wholly unjustified, since it was the initiative and energy of the imperial Estragonian government which had carried out the project. Nevertheless the empire of Nyandra invoked an agreement of long standing which specified that all boundary disputes should be arbitrated. But neither

party to the dispute would consider the claims of the other, and we must record the painful fact that a state of active war resulted.

By either Martian or Terrestrial standards, it seems to have been a somewhat amateurish war. It was prosecuted in a spirit of exasperation rather than of actual rancor. The Dzorans were never a bellicose people, and the military arts had not been practiced for many generations. Their armies had evolved into exalted police units. Consequently

there were encounters, scarcely worthy of the word "battles" and more aptly described as tremendous brawls, in which edged weapons were wielded with vigor if not with expertness. There were casualties, but the people of Dzorán have astonishing powers of recovery from bodily damage.

At this stage the Nyandrian forces dumfounded their opponents by reviving the military use of explosives. The Estragonian capital, Strofander, was thrown into a turmoil by a series of mysterious bombings. A certain officer of the intelligence division, one Fethwarn, was detailed to investigate these incidents.

WHEREFORE, in due time the intelligence officer, Fethwarn, sought out Mordagond, the chief of the Estragonian high command, at the latter's field headquarters. At the moment both armies had desisted from the onslaught by mutual consent, since the day was one of very fine Dzoranian weather—high humidity, pellucid sky, blazing sunshine—ideally suited for relaxation and absorption of the rays of the double sun. Fethwarn advanced with sinuous and resilient stride through a forest of giant fernlike growths which were, in fact, sentient creatures rooted in the spongy soil. There were eyespots upon their fronds, and they parted before him as he approached. He found Mordagond and his staff in a sun-drenched clearing, reclining in serpentine coils upon a carpet of lichenous stuff which rippled and whispered, although there was no wind.

"O deep-rooted and overshadowing tree of wisdom," began Fethwarn, disposing himself before Mordagond in the shape of a prostrate letter S, "I have solved the nature of the attacks upon Strofander and

the means whereby they were perpetrated."

"You were assigned the problem in the expectation that you would do so," responded Mordagond, elongating the filaments of his stalked eyes to the limit of their elasticity. "What have you discovered?"

"The enemy is firing upon us with a gun which discharges explosive shells."

"Ridiculous!" protested Mordagond. "Strofander is one hundred and twenty miles from the border. There is not an artillery piece in Dzorán outside of a museum, and none of them would throw a projectile the required distance if anyone were foolhardy enough to fire it. Also, Nyandra has not had time to build a gun capable of the performance you postulate."

"Our neighbors of Nyandra have had more time at their disposal than you suspect, and they *have* constructed a gun," said Fethwarn. "It is mounted—not on Nyandrian soil, but on ours—slightly more than one mile from Strofander."

"This is no time for jesting!" declared Mordagond angrily. "Allow me to point out that the area you mention is thickly populated and heavily policed. Also that ninety percent of the explosions have occurred in the interior of buildings, and that the flight of shells would be quite audible—whereas no such sounds have been reported by a single one of a multitude of witnesses. Obviously we are dealing with an organized conspiracy which seeks to terrify us with time bombs."

"Time bombs?" repeated Fethwarn. "In a sense you are correct; in the sense in which you use the term you are mistaken. You have in mind a bomb of the slow fuse or of the clockwork type. That was my original theory. But the truth is

otherwise, and quite amazing. I obtained the first clue from an incident which recently took place in the water crypts of the imperial residence. A projectile appeared therein, under the very eyes of the crypt warden, but failed to explode. Its descent shattered a magnesiaware drum of rare old lithia water, aged in the crock, and the shell half buried itself in the concrete pavement. The warden swears that the missile seemed to materialize out of thin air, and I personally verified the absence of any opening through which it could have entered."

"Outrageous! Incredible!" cried Mordagond. "You examined this projectile, of course?"

"I did, with the permission of His Imperial Verdure—may his years be forever green," affirmed Fethwarn. "I ordered that it be carefully transported to the steelworks at Strofander, where it was taken apart under my supervision. By some oversight the detonator had been omitted. But in its base was a curious mechanism which first baffled me, then led me to an astounding discovery. The Nyandrians are attacking Strofander with shells which traverse not only space, but time as well."

"I fail to understand you. Every object, moving or stationary, traverses time," Mordagond objected. "You and I are traversing time; in other words, we continue to exist."

"We traverse time at the normal rate, in the normal way," observed Fethwarn. "This projectile did not. It was fired from a gun on a mobile mount furnished with a time drive. Strofander is being bombarded from the middle of next week—from half past ten in the morning of next Wednesday, to be exact."

"You are undoubtedly mad," declared Mordagond.

"I appreciate your feelings, but

you shall have photographic proof. Six hours after the removal of the projectile from the imperial residence an invisible agency blasted a large opening from the outside, through the masonry into the crypts. It is just such an opening as would have been made by the shell in its flight. It was then that I realized that it had been launched from a point in the future, and so understood the true nature of my problem. With this as a clue, I mastered the workings of the mechanism in the base of the shell, then had it attached to this belt of copper."

FETHWARN indicated a small case plated with metallic cobalt, riveted to his belt.

"This curious invention is fairly obvious in principle and could have been developed before this," continued Fethwarn. "When in operation it reorients the wearer in time. I can now move freely or stand still in time when I so desire. Observe: I shall advance a few seconds into the future."

Fethwarn inserted the jointless tendrils which served him as fingers into certain apertures of the cobalt-plated case and vanished. After a brief interval he reappeared.

"From the angle and depth of penetration of the projectile into the floor of the imperial water crypt, together with the perforation in the wall, I roughly estimated the spatial direction and distance of the gun which fired it. A point above one mile from Strofander was indicated, near the crossroads hamlet of Nelfir. From the time interval between appearance of the projectile and its penetration of the wall of the crypt I deduced the time range of the trajectory, using the correlation equations of Dzath. A brief excursion into the future verified my deductions. I ob-

tained a photograph of the weapon in action."

He presented a small silver-edged folder to Mordagond, who opened it and curved his stalked eyes above it incredulously.

"Why, the gun and the gunners are in the middle of the crossroads!" marveled Mordagond. "And there are wayfarers near at hand who seem entirely oblivious to its presence, although it is in the act of firing!"

"Those are wayfarers who shall be at that point at half past ten next Wednesday morning," explained Fethwarn.

"But why do they disregard the gun?"

"Ah, when I tell you the answer to that you will indeed admire the ingenuity of the Nyandrians. Both the gun and those who serve it are equipped with duplicates of this device at my side, which functions both as time drives and as—what shall I call them?—as time arresters. The piece and its crew are existing along another time axis at right angles to the direction of our 'normal time,' so that from our point of view they are existing perpetually in the same instant. To them time passes in its accustomed fashion; their timepieces tick on in the usual way. To them we 'normally' existing creatures and our environment seem frozen, immobilized in the conditions of that instant. They find themselves in a motionless, statuesque world. When we ourselves shall arrive at that instant in the course of our 'normal' progression through time, no one will be aware of the object at the crossroads because it will seem to exist only for a fleeting, infinitesimal moment. It will have appeared and vanished again too quickly to register upon our perceptions. In effect, it becomes nonexistent.

"I secured the photograph by ori-

enting myself along still another time axis at right angles to that of the gun, and approached it as an instantaneous, invisible entity. I walked among the gun crew, clambered upon the gun, inspected it in detail. I endeavored to tamper with its mechanism, to dislodge members of the crew from their positions, but it was as if everything was composed of infinitely massive material welded to the spot. Then I realized that since, relative to their time axis, any physical force which I exerted endured for zero time—or almost zero time—the effects thereof would of necessity also be zero, or infinitesimal."

Mordagond pondered Fethwarn's words, then remarked:

"I have thought of a difficulty. How does the gunner know that his shots are finding the target?"

"The solution of that problem is simple but ingenious. The Nyandrians have—or I should say, they had—a secret observer in Strofander who was in telephonic communication with the gunner. When the gun moved to its position through space and time it unwound a telephone cable behind it."

"A telephone line from now to next Wednesday? Marvelous! But the observer is in the present and moving normally through time. The interval between now and then constantly grows shorter."

"The cable reel automatically draws in the slack. I might add that I oriented myself along the time axis of the cable and cut it—somewhere about next Tuesday noon—when I discovered its presence."

"We must duplicate these devices of the Nyandrians—in quantity," decided Mordagond. "We must be able to immobilize our forces in the same instant of time as theirs, in time to prevent ourselves from being

surrounded in time—if I make myself clear.”

AND, since the technicians of Estragon were no less able and resourceful than those of Nyandra, it was done even as Mordagond decreed. The warfare between the two empires moved into next week, then into the week after next, side-stepped to and fro along an ever-increasing complexity of mutually perpendicular time axes. The bombardment of Strofander ceased, and along its humid arcades—tufted with sentient, undulating moss—the green-skinned populace went about their affairs untroubled. The contending armies communicated less and less frequently with the present.

Eventually Mordagond requested a parley with the Nyandrian commander, Esthondar.

“May you grow ever greener in the radiance of the two suns,” began Mordagond cordially. “We have shifted our time axis at least seventy-five times. Just where in time are we? Should we not now devote some thought and calculation to the problem of returning to a normal orientation?”

“Your words are as a fountain of water from the depths of Dzorán,” responded Esthondar. “I have been pondering the same question. I weary of this endless combat in a silent, motionless world. Let us commence immediately.”

So it came about that the two armies returned, somewhat confused to their own proper time—a long and tortuous journey. They felt only a slight chagrin on learning that—in the absence of any certain information as to the outcome of the war—the boundary dispute between Estragon and Nyandra had been duly arbitrated before the first major offensive had begun.

And peace prevailed thereafter upon Dzorán.



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FOREWORD

IT was about two o'clock in the afternoon and Sergeant Kelly, having imbibed a bit too much corned beef and cabbage at lunch, was dozing comfortably at his desk. He did not immediately hear the stumbling feet of Patrolman O'Rourke, but when he did, he was, in consequence, annoyed.

Sergeant Kelly opened his eyes, grunted, and sat slowly forward, hitching at his pants which he had unbuckled to ease his ballooning stomach.

His eye was offended at first, by Patrolman O'Rourke's upset uniform and then, suddenly, interested. And what sergeantly eye would not have been? For Patrolman O'Rourke's mouth was slack and his eyes could have been used as bowling balls. He ran into a spittoon and heeded its thundering protest and departure not at all. Bracing his tottering self against the desk without changing his dazed expression, O'Rourke gulped:

"It's gone."

"Well!" said Sergeant Kelly. "Don't stand there like a jackanapes! Speak up! *What's gone?*"

"The Empire State Building," said Patrolman O'Rourke.

I.

NO ONE knew why he was called Pop unless it was that he had sired the newspaper business. For the first few hundred years, it appeared, he had been a senior reporter, going calmly about his business of reporting wholesale disaster, but during the past month something truly devastating had occurred. Muttering noises sounded in the ranks.

Long overdue for the job of city editor, lately vacated via the undertaker, Pop had been demoted instead of promoted. Ordinarily Pop was not a bitter man. He had seen too many cataclysms fade into the staleness of yesterday's paper. He had obit-ed too large a legion of generals, saints and coal-heavers to expect anything from life but its eventual absence. But there were limits.

When Leonard Caulborn, whose diapers Pop had changed, had been elevated to city editor over Pop's decaying head, Pop chose to attempt the dissolution of gaul in the manufactures of Kentucky. But even the latter has a habit of wearing away and leaving the former friend a mortal enemy. Thus it was, when the copy boy came for him, that Pop swore at the distilleries as he arose and looked about on the floor where



"I like models, you know—little things," explained the professor. "I . . . eh . . . like to make them."

he supposed his head must have rolled.

"Mr. Caulborn said he had a see-yuh rightaway," said the copy boy.

AST—9

Pop limped toward the office, filled with resentment.

Leonard Caulborn was a wise young man. Even though he had

no real knowledge of the newspaper business, people *still* insisted he was wise. Hadn't he married the publisher's daughter? And if the paper didn't make as much as it should, didn't the publisher have plenty of stockholders who could take the losses and never feel them—much, anyway.

Young and self-made and officious if not efficient, Caulborn greeted Pop not at all, but let him stand before the desk a few minutes.

Pop finally picked up a basket and dropped it a couple inches, making Caulborn look up.

"You sent for me?" said Pop.

"I sent for you— Oh, yes, I remember now. Pending your retirement you've been put on the copy desk."

"My *what?*" cried Pop.

"Your retirement. We are retiring all employees over fifty. We need new people and new ideas here."

"Retirement?" Pop was still gaping. "When? How?"

"Effective day after tomorrow, Pop, you are no longer with this paper. Our present social security policy—"

"Will pay me off about twenty bucks complete," said Pop. "But to hell with that. I brought this paper into the world and it's going to take me out. You can't do this to me!"

"I have orders—"

"You are issuing the orders these days," said Pop. "What are you going to do for copy when you lose all your men that know the ropes?"

"We'll get along," said Caulborn. "That will be all."

"No it won't either," said Pop. "I'm staying as reporter."

"All right. You're staying as reporter then. It's only two days."

"And you're going to give me assignments," said Pop.

Caulborn smiled wearily, evidently thinking it best to cajole the old coot. "All right, here's an article I clipped a couple months ago. Get a story on it."

When Caulborn had fished up the magazine out of his rubble-covered desk he tossed it to Pop like a citizen paying a panhandler.

Pop wanted to throw it back, for he saw at a glance that it was merely a stick, a rehash of some speech made a long while ago to some physics society. But he had gained ground so far. He wouldn't lose it. He backed out.

Muttering to himself he crossed to his own desk, wading through the rush and clamor of the city room. It was plain to him that he had to make the most of what he had. It was unlikely that he'd get another chance.

"I'll show 'em," he growled. "Call me a has-been. Well! Think I can't make a story out of nothing, does he? Why, I'll get such a story that he'll *have* to keep me on. And promote me. And raise my pay. Throw me into the gutter, will they?"

He sat down in his chair and scanned the article. It began quite lucidly with the statement that Hannibal Pertwee had made this address before the assembled physicists of the country. Pop, growing cold the while, tried to wade through said address. When he came out at the end with a spinning head he saw that Hannibal Pertwee's theories were not supported by anybody but Hannibal Pertwee. All other information, even to Pop, was so much polysyllabic nonsense. Something about transportation of freight. He gathered that much. Some new way to help civilization. But just how,

the article did not tell—Pop, at least.

Suddenly Pop felt very old and very tired. At fifty-three he had ten thousand by-lines behind him. He had built the *World-Journal* to its present importance. He loved the paper and now it was going to hell in the hands of an incompetent, and they were letting him off at a station halfway between nowhere and anywhere. And the only way he had of stopping them was an impossible article by some crackbrain on the transportation of freight.

He sighed and, between two shaking hands, nursed an aching head.

II.

A pavement-pounding reporter is apt to find the turf trying—and so it was with Pop. Plodding through the dismal dusk of Jersey, he began to wish that he had never heard the name of Hannibal Pertwee. Only the urgency of his desire to keep going had brought him thus far along the lonely roads. Grimly, if weakly, he at last arrived at a gate to which a Jerseyite had directed him.

With a moan of relief he leaned against a wire-mesh fence and breathed himself to normalcy. It wasn't that he was getting old. Of course not! It was just that he should have worn more comfortable shoes.

He looked more observantly about him and became interested. Through this factory fence he could see a house, not much bigger than an architect's model, built with exactness which would have been painful to a more esthetic eye than Pop's.

The fence itself next caught his interest. He fingered the steel-mesh with wonder. At the top the poles bent out to support three strands of savage-looking barbed wire. Pop

stepped back and was instantly smitten by a sign which shouted:

1,000,000 VOLTS
Beware!

Pop felt a breeze chill him as he stared at his fingers. But they were still there and he was encouraged. Moving toward the gate he found other signs:

BEWARE OF THE LIONS!

Pop searched anxiously for them and, so doing, found a third:

AREA MINED!

And:

TRESPASSERS BURIED
FREE OF CHARGE!

Uncertain now, Pop again stared at the tiny house. It began to remind him of a picture he had seen of Arizona's gas chamber.

But, setting his jaw to measure up to the threats around him, he sought the bell, avoiding the sign which said:

GAS TRAPS

And the one which roared:

DEATH RAYS
KEEP OUT!

He almost leaped out of his body when a voice before him growled: "What is your business?"

Pop stared. He backed up. He turned. Suspiciously he eyed the emptiness.

At last, rapidly, he said, "I want to see Hannibal Pertwee. I am a reporter from the New York *World-Journal*."

There was a click and a square of light glowed in a panel. For seconds nothing further happened and then, very slowly, the gate swung inward.

Boldly—outwardly, at least—Pop marched through. Behind him the gate clicked. He whirled. A little tongue of lightning went licking its chops around the latch.

It took Pop some time to permanently swallow his dinner. He glared around him but the strange change in the atmosphere soon registered upon his greedy senses.

Here the walk was only a foot wide, bordered by dwarf plants. What Pop had thought to be shrubbery was actually a forest of perfect trees, all less than a yard tall but with the proportions of giants. Here too were benches like doll furniture and a miniature fountain which tinkled in high key. Sundials, summerhouses, bridges and flowers—all were tiny, perfect specimens. Even the fish in the small ponds were nearly microscopic.

Pop approached the house warily as though it might bite. When he stood upon the porch, stooping a little to miss the roof, the door opened.

STANDING THERE was a man not five feet tall, whose face was a study of mildness and apology. His eyes were an indefinite blue and what remained of his hair was an indefinite gray. He was dressed in a swallow-tail coat and striped pants and wing collar, with a tiny diamond horse-shoe in his tie. Nervously he peered at Pop.

"You are Mr. Brewhauer from the *Scientific Investigator*?"

"No. I'm from the *New York World-Journal*."

"Ah."

"I came," said Pop, "to get a story on this lecture you handed out a couple months ago."

"Ah."

"If you could just give me a few

facts, I should be very glad to give you a decent break."

"Oh yes! Certainly. You must see my garden!"

"I've just seen it," said Pop.

"Isn't it beautiful? Not a bit like any other garden you ever surveyed."

"Not a bit."

"Such wholesome originality and such gigantic trees."

"Huh?"

"Why, over a thousand feet tall, some of them. Of course trees don't ordinarily grow to a thousand feet. The tallest tree in the world is much less than that. Of course the Aldrich deep is 30,930, but then no trees grow in the ocean. There, now! Isn't the garden remarkable? I'm so sorry to walk you all over the place this way, but I have recently given my cars to charity."

"Hey," said Pop. "Wait. We haven't been anywhere."

"No, indeed not. My garden is only a small portion of what I have yet to show you. Please come in."

Pop followed him into the house, almost knocking off his hat on the ceiling. The house was furnished in somewhat garish fashion and, here again, everything was less than half its normal size, even to the oil paintings on the walls and the grand piano.

"Please be seated," said Hannibal Pertwee.

Somehow Pop squeezed himself into a chair. There was a tingling sensation as though he was receiving a rather constant shock. But he paid it no heed. Determined to get a story, he casually got out his cigarette case and offered Hannibal a smoke.

The little man started to refuse and then noticed the case. "What an unusual design!"

"Yeah," said Pop, and pressed the

music button. "The Sidewalks of New York" tinkled through the room.

"Fascinating," said Hannibal. "What delicate mechanism! You know, I've made several rather small things myself. Here is a copy of the Bible which I printed." And in Pop's hand he laid the merest speck of a book.

Pop peered at it and somehow managed to open it. Yes, each page appeared to be perfectly printed. There was a slight tingling which made him scratch his palm after he had handed the volume back.

"And here is a car," said Hannibal, "which I spent much time constructing. The engine is quite perfect." And thereupon he took the inch-long object and poked into it with a toothpick. There was a resultant pur.

"It runs," said Pop, startled.

"Of course. It should go about a hundred thousand miles to the gallon. Therefore, if a car would make the trip and if it could carry enough gas, then it could go to the Moon. The Moon is only 238,857 miles from Earth, you know." And he smiled confidently. He had forgotten about the car and it started up and ran off his hand. Pop made a valiant stab for it and missed. Hannibal picked it up and put it away.

"Now I must show you around," said Hannibal. "Usually I start with the garden—"

"We've seen that," said Pop.

"Seen what?"

"The garden."

"Why," said Hannibal, "I said nothing about a garden, did I? I wish to show you my trains."

"Trains?"

"Have you ever played with trains?"

"Well—I can't say as I have. You see, Mr. Pertwee, I came about

that lecture. If you could tell me what it is about—"

"Lecture?"

"That you made before the physics society. Something about moving freight."

"Oh! 'The Pertwee Elucidation of the Simplification of Transportational Facilities as Applying to the Freight Problems of the United States.' You mean that?"

"Yes. That's it!"

"I'm sorry, but Mr. Pertwee does not refer to the subject now."

"Mr.— Wait, aren't you Mr. Pertwee?"

"Yes, indeed. Now about my trains—"

"Just some comment or other," pleaded Pop. "I couldn't understand just what it was all about."

"There's nothing half so lovely as a train," said Mr. Pertwee, almost firmly.

Pop took out his case and lighted a cigarette.

"Would you mind pressing that button again?" said Pertwee.

Once more the worn mechanism tinkled out its music. When it had done, Hannibal took the case and inspected it anew with great attention.

"You said something about trains," said Pop.

"Pardon?"

Pop took back his case and put it firmly away. "You spoke of trains. There may be a story there."

"Oh there is, there is," said Hannibal. "But I don't talk about it, you know. Not with strangers. Of course you are not a stranger, are you?"

"Oh, no, indeed," said Pop, mystified because he could see no bottle about. "But let's get on to the trains."

Hannibal bounced eagerly up and led his caller through the house,

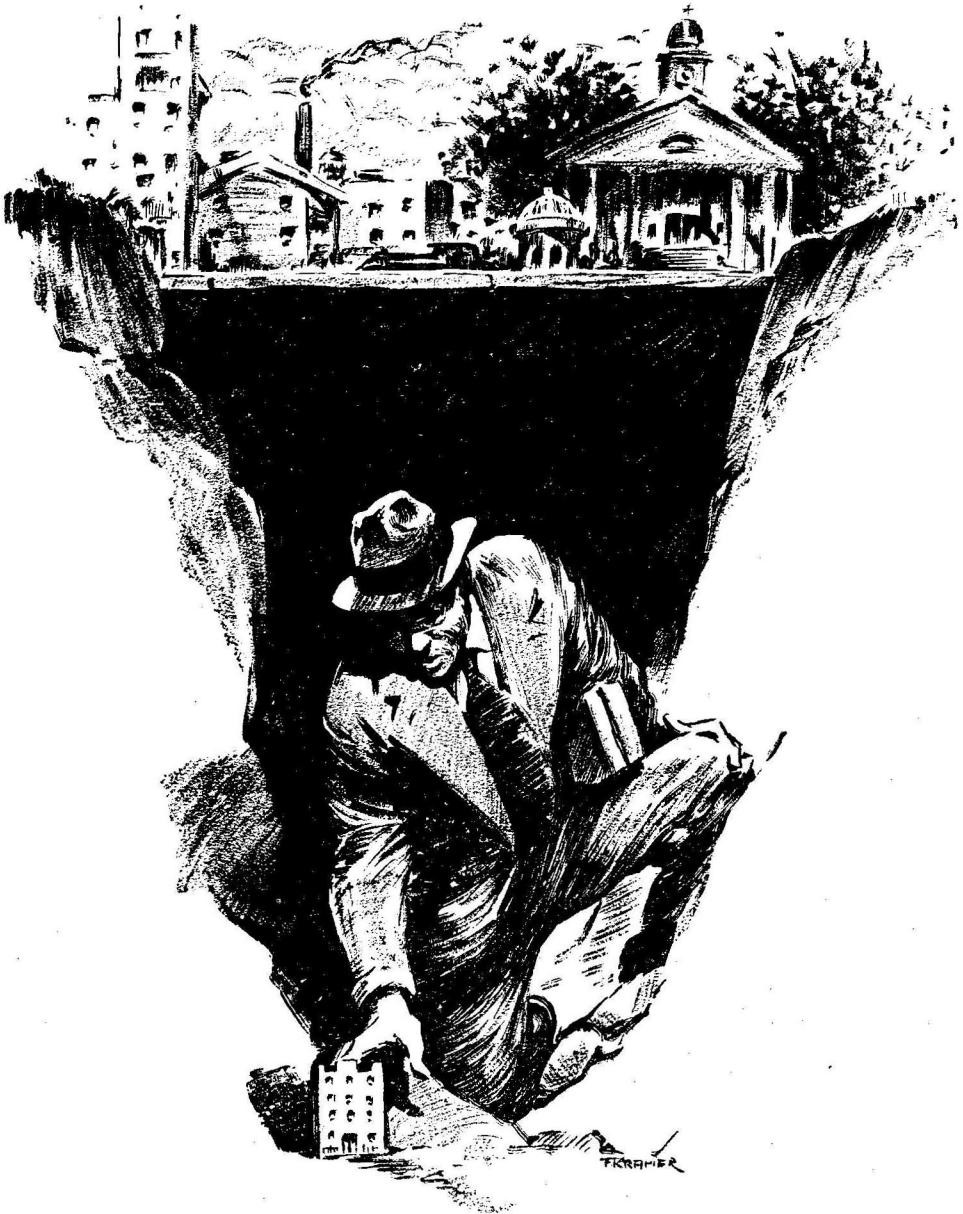
pausing now and then to show other instances of things done very small.

FINALLY they reached the train room and here Pop stopped short in amazement. For here, spread out

at their feet, were seemingly miles of track leading off in bewildering tangle of routes.

"My trains," said Hannibal, caressingly.

Pop just kept staring. There



Pop bent down. In the center of the very large hole was a very small building. It looked like the ex-apartment house, but—

were toy stations and semaphores and miniature rivers and roads and underpasses and sidings and switches. And on the tracks stood a whole fleet of freight cars in a yard. Engines stood about, ready to do the switching. The round-houses were crammed with rolling stock and, in short, nearly every type of equipment used was represented here.

Hannibal was already down on his knees at a switchboard. He grabbed up a top hat and plonked it on his head and then beamed at Pop.

"Cargo of strawberries for Chicago," said Hannibal. He threw half a dozen switches. The engines in the freight yard came to life and began to charge and puff and bang into cars, making up a train without any touch from the operator except on the control board.

"That bare space away over there is Chicago," said Hannibal.

Pop saw then that this room was vast enough to contain a replica of the United States and realized with a start that these tracks were each one a counterpart of an actual railroad line. Here were all the railway routes in the United States spreading over a third of an acre!

"This is New York," said Hannibal, indicating another bare space. "Only, of course, there isn't anything there yet. Now here we go!"

The freight, made up, began to move along the track faster and faster. It whistled for the crossings and rumbled over the rivers and stepped into a siding for a fast freight to go by, took on water and finally roared into the yard beside the bare space which was Chicago. Here it was broken up and other engines began to reform it.

In the space of two hours, Pop watched freight being shunted all over the United States. He was ex-

cited about it for he had never had a chance to play with trains as a boy and now it seemed quite logical that they should interest him as a man.

Finally Hannibal brought the cars back to the New York yard and broke up the last train. With a sigh he took off his hat and stood up, smiling apologetically.

"You must go now," said Hannibal.

"Look," said Pop. "Just give me some kind of an idea of what you were talking about in that article so I can mention it in the paper."

"Well—"

"I'll do you some good," said Pop.

"Do you understand anything about infinite acceleration?"

"Well, no."

"Or the fourth dimension?"

"Wellllllll—"

"Or Einstein's mathematics?"

"No."

"Then," said Hannibal, "I don't think I can explain. *They* would not believe me." And he laughed softly. "So you see, you wouldn't either. Good night."

And Pop presently found himself outside the gate, confronted once more with the long walk to the station and the long ride back to New York.

A fine job he'd done. No story.

Still— Say! Those trains would make a swell yarn. A batty little scientist playing with toy railroads— Sure. He'd do it. Play it on the human interest side. Great minds at leisure. Scientist amuses self with most complete model road in the world— Yes, that was it. Might do something with that.

But he'd never get far with it.

Trudging along he reached for his cigarette case. He fumbled in other pockets. Alarm began to grow on him. He couldn't find it! More slowly he repeated the search.

Hurriedly then he tore back to the gate and shouted at the house. But the only reply he got was printed on the sign:

TRESPASSERS BURIED
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III.

POP, it might be said, was just a little proud of having turned out a presentable story where no story had been before. And, feeling the need of a little praise, he finished off his story the following morning and took it to Caulborn personally.

Caulborn, in a lather of activity which amounted to keeping half the staff enraged, pushed up his eyeshade—which he wore for show—and stared at Pop with calculated coldness.

"Well?"

"That story you sent me out on," said Pop, putting the sheets on Caulborn's desk. "You didn't think there was any story there. And you were right as far as news was concerned. But human interest—"

"Humph," said Caulborn, barely glancing at the type. He was, in truth, a little annoyed that Pop had gotten anything at all. When Caulborn had taken this job he had known very well that there were others in the office who had more seniority, more experience, and therefore a better claim.

"You call this a story?" said Caulborn. "You think we print anything you care to write? Go back to the copy desk." And so saying he dropped the sheets into the wastebasket with an emphatic gesture of dismissal.

Pop was a little dazed. He backed out and stood on the sill for seconds before he closed the door. A hurrying reporter jostled him and was

about to rush on when he saw Pop's expression.

"Hey, you look like you need a drink."

"I do," said Pop.

The reporter glanced at Caulborn's door. "So he's making it tough for you, is he? The dirty rat. Never mind, Pop, when better newspapermen are built they'll all look like you. Something will break sooner or later—"

"I'm leaving tomorrow."

"Say, look now! Don't quit under fire. You know what ails that guy? He's scared, that's all. Scared of most of us and you in particular. Why, hell's bells, you belong in that chair. We're losing money, hundreds a day, and when it gets to thousands the publisher himself will get wise—"

"I'm being laid off," said Pop.

"You? For God's sake!"

Pop wandered back to his desk. Two other reporters came over to commiserate with him and curse Caulborn but Pop didn't have anything to say. He just kept on pulling old odds and ends out of his desk, throwing many of them away but making a packet out of the rest.

"You're not leaving today, are you?" said a third, coming up.

"What else can I do?" said Pop.

And he went on cleaning out his desk, looking very worn and old and quiet. He scarcely looked up when Caulborn passed him, on his way out to lunch.

IT WAS about one o'clock and he was just tying a string around his belongings—a pitifully small package to show for all his years in this city room. The phone rang on the next desk and Pop, out of habit, reached across for it.

"Gimme rewrite," barked an excited voice.

"I'll take it," said Pop suddenly.

"This's Jenson. I'm up on the Drive. Ready?"

Pop raked some copy paper to him and picked up a pencil. He was a little excited by the leg man's tone. "Ready."

"At twelve-forty-five today, Grant's Tomb disappeared."

"Huh?"

"Get it down. The traffic on the Drive was at its noon hour peak and the benches around the structure were filled with people. When, without warning, a rumble sounded, the alarmed populace—"

"To hell with the words," cried Pop. "Give me the story. How did it happen?"

"I don't know. Nobody knows. There are half a dozen police cars around here staring at the place

Grant's Tomb was. I was about a block away when I heard shrieks and I came tearing down to find that traffic was jammed up and that people were running away from the place while other people ran toward it. I asked a nursemaid about it and she'd seen it happen. She said there was a rumbling sound and then suddenly the Tomb began to shrink in size and in less than ten seconds it had vanished."

"Was anybody seen monkeying with it?" said Pop, feeling foolish instantly.

"A chauffeur said he saw a little guy in a swallowtail coat tear across the spot where the Tomb had been."

"How many dead?"

"Nobody knows if anybody is dead."

"Well, find out!"

"How can I find out when every-

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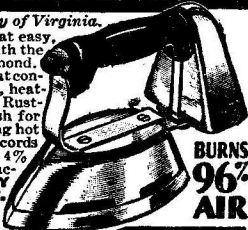
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body that was sitting on the steps and all completely disappeared?"

"What?"

"They're gone."

"Somebody is crazy," said Pop. "No bodies?"

"No Tomb."

"I got this much," said Pop. "You hoof it back there and get stories from the witnesses." He hung up and whirled to shout down the line of desks, "Grant's Tomb's gone! Get Columbia on the phone. We got to have a statement from somebody that knows his stuff. You, Sweeney, grab an encyclopedia and see if anything like this ever happened before. Morton, grab a camera and get out there for some pictures. Dunstan! You go with Morton and find the relatives of the people that have vanished along with the Tomb. Get going!"

Nobody asked any questions beyond a stammer of incredulity. Nobody thought of tearing out to find Caulborn. Sweeney, Morton, Dunstan and others went into a flurry of activity.

"Branner!" cried Pop into the interoffice phone. "Start setting up an extra. We'll be on the street in half an hour. Second extra in an hour and a half with pictures."

"Is this Pop?"

"Yeah, this is Pop. What are you waiting for?"

"O. K. Half an hour it is."

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Dept. 165-II, Chicago



"Louie, get some shots of Grant's Tomb out of the files and rush them down to Composing." Pop pulled his old typewriter toward his stomach and his fingers began to flash over the keys. Hunt and punch it was, but never had a story rolled so swiftly. In five minutes it was streaming down to Composing.

Pop got up and paced around his desk. He rumbled his graying hair and looked unseeingly out across the City Room. He had pinch hit as night editor so often that he did not question his authority to go ahead. And still nobody thought of Caulborn.

SHORTLY a damp proof was rushed up. The copy boy hesitated for a moment and then laid it on Pop's desk. Pop looked it over. "O. K. Let it run."

The boy loped away and Pop, reaching for a cigarette, again missed his case. Instead he hauled up a limp package and lighted a match. The phone rang somewhere.

"Take it, Pop," said a reporter.

Pop took it.

"Who's this?" said Pop.

"Freeman. Grab your pencil."

"Got it," said Pop, beginning to tingle at the tone of the leg-man.

"The Empire State Building disappeared about five minutes ago."

"Right," said Pop.

"I'm down at Precinct— About three seconds ago a cop came staggering in with the news. I haven't had a chance to look."

"Get right down there and see," said Pop. "Grant's Tomb vanished just before you called."

"Check."

Pop put down the phone and dashed over to the window. But in vain he searched the skyline for any sign of the Empire State Building. "Gone," he said. The human being

in him was appalled. The newspaperman went into action.

"Goodart," roared Pop, "get a camera down to the Empire State. It's disappeared."

"Check," said Goodart, dashing away.

"Copy boy!" yelled Pop. And into the phone, even while he started the second story, he yelled, "Branner. Limit the first extra. Get set for a second. Story coming down. The Empire State Building has disappeared."

"O. K.," said Branner.

"Get some pictures down to Branner on the Empire State," shouted Pop. His fingers were blurring, so fast they raced over the keys.

"New York is going piece by piece," said a reporter. "Oh boy, what a story!"

"Call the mayor, somebody!" said Pop. "Tell him about it and ask him what he means to do."

"Check," said a cub eagerly.

"No such incident in the encyclopedia," reported Sweeney.

"Unprecedented," said Pop. "Lawson and Frankie! You two get cameras and rush downtown to be on hand in case any other big buildings exit. Copy boy!"

And the second story was on its way to Composing. And still nobody remembered Caulborn.

Pop went back to the window, but the Empire State was just as invisible as ever.

"Columbia says mass hypnotism or hysteria," said a girl.

"Get their statement," said Pop.

"Got it."

"Dress it up and shoot it down."

"Check."

Pop walked around his desk. Again he reached for his cigarette case and was again annoyed to find it gone. He lighted up, frowning

over new angles, one eye hopefully on the phone.

"Find out how many people are usually in the Empire State," said Pop.

"Check," said a reporter, grabbing a phone.

"Don't try to call the Empire State!" said Pop. "It isn't there!"

The reporter looked silly and changed his call to the home of a director of the Empire State.

CERTAIN that the story would keep breaking, Pop was not at all surprised when Frankie called.

"Pop! This's Frankie. Pennsylvania Station's gone!"

"Penn— Full of people?"

"And trains and everything!" cried Frankie. "There's nothing there but a hole in the ground. I was lucky, about a block away and saw it happen! You said *big* so I figured Pennsylvania—"

"The story!"

"Well, there was a kind of rumble and then, all of a sudden, the station seemed to cave into itself and it was gone!"

"Statements!"

"A little guy in a swallowtail coat almost knocked me down running away. He was scared to death. Everybody was trying to get away. And right on the corner one of our boys was shouting our first extra. The whole building just disappeared, that's all. People, trains, everything. You ought to see the hole in the ground—"

"Get statements and rush your pictures back here. Don't be a damned photographer all your life."

"O. K., Pop."

"Pennsylvania Station," yelped Pop. "Tim, get this for rewrite. About five minutes ago, Pennsylvania Station disappeared, people, trains, everything. There's nothing

but a hole in the ground. There was a rumble and then the thing vanished. Seemed to cave into itself but there is no débris. It's gone. All gone."

"O. K., Pop," said Tim, his mill beginning to clatter.

"Copy boy!" shouted Pop, pointing at Tim. "Pictures of Pennsylvania Station!" He grabbed a phone. "Branner! Keep adding to that extra. We got pictures coming of Pennsylvania Station. It's gone."

"Penn— Oh boy, what a story!"

Pop hung up. "Angles, angles—" The phone rang.

"This is Lawson. I just heard that Grand Central disappeared. I'll get down there for some pictures and call you back."

"Pennsylvania Station just went," said Pop.

"The hell," said Lawson.

"On your way," said Pop.

"Gone," said Lawson.

Pop reached for another phone which was clamoring.

"This is Jenson again. I been checking all the angles. About a thousand people saw it disappear when—"

"What? What's gone now?"

"Why, Grant's Tomb—"

"Hell, kill it. The Empire State, Pennsylvania and Grand Central have gone since then. Get down here with your photographer."

"I haven't seen him. Did you send one?"

"Get down here. Do you think this is a vacation? Bring in your yarns. They'll just make our fourth extra."

"O. K., Pop."

"Got a statement from the mayor. He's yelling sabotage," said the cub. "He says he's phoning the governor to call out the militia. He says they can't do this to his town."

"Banner for extra number three,"

barked Pop into the phone. "Mayor Objects. Calls Out Militia. Story coming down." He jabbed a finger at the cub's typewriter. "Roll it out and spread it thick. They'll be half panicked by now. Stab in a human-interest angle. Make 'em take it calm."

"Check," said the cub nervously.

POP WALKED around his desk and again reached for his cigarette case, to again discover that it was missing. "Angles—two men with swallowtail coats—"

Pop whirled, "Eddy! Take this lead. Mystery man seen in two catastrophes. A small man with a swallowtail coat was present today at both the vanishing of the Tomb and Pennsylvania Station. Was seen to run across place where Tomb had been and collided with one of our reporters just after Pennsylvania disappeared. Got it?"

"Check."

Pop went over to the window. The Empire State was still gone. A thought was taking definite form in his mind now. For some reason he kept harking back to Hannibal Pertwee. Railway stations, cigarette case, swallowtail coat—

Freeman came dashing up. "She's sure gone."

"What?"

"The Empire State. There's nothing but a hole in the ground. There were umpteen thousand people inside and there's no sign of them—"

"O. K.! Do me a story about the state of the city—how calm they're taking it. Smooth them down. Third extra on its way and you'll make the lead in the fourth."

"Right," said Freeman. "But you oughta seen that cop—"

"Don't tell me. I don't buy the paper. Write it."

"O. K., Pop."

Pop turned back to his desk. He was so preoccupied that he did not



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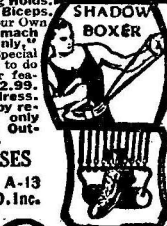
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see a dark cloud come thundering through the City Room.

Caulborn, with a copy of the first extra in his hands, bore down upon what was obviously the center of the maelstrom.

"Did you do this?" he cried, shaking the extra under Pop's nose.

"Sure. What about it?"

"Why didn't you call me? You know where I eat lunch! How do you know this story is true? What do you mean spreading terror all over the town? How is it that we get a paper out so quick when there's nobody else on the streets? If this is a farce, then we'll be in Dutch plenty. Civil and criminal actions—"

"It takes guts to run a paper," said Pop coldly.

"If that's what it takes, you've got too many. Now we've got to check everything we've printed. If you've got another extra on the rollers, we'll have to kill it and find out if—"

"The third extra is on the street," said Pop.

Caulborn stared, growing angry. "And you took the authority without even *trying* to find me?"

"A story has got to go when it's hot," said Pop.

"All right! All right! And you ran this one so hot that you're driving New York into a panic! Get out!"

"What?"

"I said get out!" towered Caulborn. "You're through, finished, washed up. Today instead of tomorrow!" And, nursing his injured importance, Caulborn flung off to his office.

The City Room was very quiet.

Pop stood for a little while and then, with a shrug, picked up the package on his desk.

"Well," he sighed, "it was fun while it lasted."

"You're going to take him at his

word?" said somebody. "Just because you were smart enough not to wait? He's just sore because you did it so swell—"

"Maybe," said Pop.

"You're going to quit like this?" said Freeman.

"No. Not like this," said Pop.

"Whatcha going to do?" said the cub.

Pop hefted his package. He looked grim.

IV.

AT DUSK Pop approached the fortress of Hannibal Pertwee. But this time he did not lean against the fence or spend time in reading signs. True, he could not miss:

BEWARE OF THE LIONS!

but, having seen none on his previous visit, he refused to be alarmed. In fact, he was so unswerving of purpose that nothing short of lightning itself could have stopped him and he had an antidote for that.

At a garage he had managed to separate himself from five dollars he could ill afford; an electrician from a pair of insulated gloves, and the heaviest pair of wire cutters he could carry.

Breaking and entering would be a very serious offense, but he was first going to give Hannibal a chance.

For several minutes he waited dutifully at the gate, hoping that the mysterious voice would again speak. But this time it did not and the house remained as dark as it was small.

"You asked for it," muttered Pop.

Very painstakingly he inspected the latch. Then he donned the rubber gloves and took the cutters and went to work. In a few minutes the gate was swinging open, leaving its latch behind.

Oh, if this hunch he had was wrong!

He marched through the miniature forest down the miniature path and ducked to mount the porch. But there his purpose was eased.

Hannibal opened the door and gazed sadly at him.

"It will be so *much* work to repair that gate," said Hannibal.

"Well . . . uh . . . you see—"

"I was very busy. You are Mr. Frothingale from the *Atlantic Science Survey*, are you not?"

"I'm from the *World-Journal*," said Pop.

"You're sure you are not from the railroad company?"

"Ah," said Pop.

"Well—I am very sorry but I can't ask you in tonight. I am so busy."

"I . . . er . . . came after my cigarette case," said Pop.

"Cigarette case?"

"Yes. I lost it when I was here before. I would dislike having to part with it permanently."

"Oh, that is very shocking. Did you lose it here?"

"I had it when I was here and didn't have it after I left."

"Mightn't you have dropped it in the garden?"

"I had it while I was in the house. You don't mind if I come in and look, do you?"

"Why . . . er—"

But Pop was already shouldering past Hannibal Pertwee and the little man could not but give way. However, Hannibal skipped to the fore and guided Pop into the minute living room.

"I was sitting here in this chair," said Pop, looking under it.

Hannibal fidgeted. "Isn't it lovely weather?"

"Swell," said Pop. "You don't mind if I look elsewhere?"

"Oh, yes! I mean no! I am very busy. Really you will have to go."

"But my cigarette case," said Pop, edging toward the train room, "is very valuable to me."

"Of course, of course. I appreciate your predicament. But if I had seen it and if I find it— Oh, dear, what am I saying?"

"Well," said Pop, suddenly crafty, "I won't trouble you further. I can see how upset you are." And he extended his hand. "Good-by, Mr. Pertwee."

Eagerly Hannibal grasped the offered hand. Swiftly Pop yanked Hannibal close to him and gave him an expert frisk. The cigarette case leaped out of Hannibal's pocket. Pop looked at it with satisfaction.

"I wonder," said Hannibal, dis-trait, "how that got there?"

"So do I," said Pop. "And now if I could inspect your trains again—"

"Well—yes. All right. Just come this way." And he stepped through the door.

Pop was so close behind him that he almost got cut in half when the door slammed shut. There was the rumble of a shot bolt and Pop's weight against the door had no effect at all. He swore and dashed for the hall. Another door slammed there. Pop stood glaring through the walls at Hannibal. Then he got another idea and rushed outside to take a tour of the house. But there was nothing to be seen.

For two hours Pop prowled in the garden. But the night was cold and Pop was hungry and, at last, he had to be content with his victory in recovering his case. He went off up the road in the direction of the station.

GRUMBLING to himself, he stood on the platform, waiting for a train to carry him back to New York. He could swear that there was some connection between the forest, the miniature car, the trains and the vanished buildings.

"Dja hear about them things disappearin' in N'York?" said a loafer.

"Yeah," said Pop.

"Awful, ain't it?" said the loafer.

"Yeah," said Pop.

"It's them Nazis," said the loafer.

Pop took out his cigarette case. It still contained several cigarettes so, evidently, Hannibal did not smoke. Pop lit up. He was about to replace the case when he wondered if any harm had come to it. He pressed the music button. No sound came forth.

"Damn him," said Pop. "Broke it." Well, he could have it fixed. Hannibal, the loon, had probably worn it out.

The train came at last and Pop settled himself for a doze. He could think best when he dozed. But his neighbor wasn't sleepy.

"Ain't that awful what them Reds did in New York?"

"I hear that people are runnin' around trying to lynch all the Reds they know about. Course some don't believe it was the Reds, and I hear tell the churches is full of people prayin'. I'm goin' in to see for myself, but I'm tellin' you you won't catch *me* walkin' into no buildings."

"Yeah," said Pop.

The train lippety-clicked endlessly, saying the same thing over and over: "Pop's through, Pop's through, Pop's through."

About eight he wandered out of the station to straggle haphazardly uptown. He was trying to tell himself that he was glad he was through. No more chasing fire engines for him. What a hell of a life

it was. Never any regular sleep, always on the go, living from story to story. Well! Now he could settle down and rest awhile. Yes, that was the ticket. Just rest. There was that farm his sister had left him. He'd go up there in the morning. Place probably all falling to pieces but it would be quiet. Yes, a helluva life for a white man. He'd followed the news for years and now all the stories he had covered were lumped into one chunk of forgetfulness—and he was as stale as yesterday's newspaper. What had it ever gotten him? Just headaches.

Shuffling along, head down, hands deep in his jacket pockets, he coursed his way to Eighth Avenue. From far off came a thin scream of a police siren. Pop stopped, instantly alert. The clang of engines followed, swooping down a side street near him. He raced up to the corner and watched the trucks and police cars stream by full blast. He whirled to a taxi and then paused, uncertain. Gradually he lost his excitement until he was again slumped listlessly. Far off the police sirens and bells dwindled and faded into the surflike mutter of the city.

"Taxi, buddy?"

Pop glanced toward the hack driver. He slowly shook his head and pulled out his cigarette case. He lighted up and puffed disconsolately. A saloon was nearby and he wandered into it to place a foot on the rail.

"Rye. Straight," said Pop.

THE British-looking barkeep pushed out a glass and filled it with an expert twist of his wrist. Pop downed the drink and stood there for a while staring morosely at his reflection in the mirror behind the pyramided wares.

"Fill it up," said Pop.

The barkeep did as bidden. "Ain't
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Canadian readers must remit with order.

that awful about them buildings and all?" he said the while. "The wickedness of this city is what brought it on. Just yesterday I says to a gent in here, I says, 'A town as sinful as this—'"

Pop took out his cigarette case. "Yeah."

"'A town as sinful as this cannot meet but one fate in the mighty wrath—'"

S W O O S S S S h !

Pop was jarred out of his wits.

The whole bar had vanished!

The whole bar, complete with tender!

The mirrors were still there, but that was all!

A drunk who had been sitting at a side table looked unblinkingly in the direction of the phenomenon and then, with great exactness, lifted his glass and spilled the contents on the floor. Unsteadily he navigated to the street.

Pop's news-keen mind examined all the possibilities in sight. Was it possible that someone had come in that door and done this? Had Hannibal followed him?

Absently he started to pay for his drink, coming to himself only when he saw for certain that he no longer leaned on the bar. He looked at the floor where the planks were patterned as the bar had stood. And then Pop received another shock.

There was the bar!

About an inch long!

Almost lost in a crack between the flooring!

Hastily he picked it up, afraid of hurting it. He could barely make out the bartender who did not seem to be moving. Pop put the thing in a small cardboard box he found in the refuse and then stowed it carefully in his pocket.

This opened up a wide range of thought and he needed air in which

to think. He went out into the street.

Why was he so certain that it was Hannibal? He understood nothing of that man's plans and certainly there were thousands of swallowtail coats in New York City. But still—

This bar had dwindled in size. Was it not possible, then, that the buildings had done likewise? And if they had, mightn't they still be there? He mulled this for a long time, standing at the curb, occasionally hearing the wonder of a would-be customer in the saloon.

"Taxi?" persisted the driver.

"Yeah," said Pop. But before he got in, his abstraction led him to take out his cigarette case and light up. Then he entered the cab. "I want to go to the place Grand Central Station was."

"O. K., buddy," said the cabby.

HE PONDERED profoundly as he waited for lights and when the driver let him out near the police cordon which had been placed around the hole, he thought he had a glimmering of the meaning behind this series of events.

He paid and strolled along the line.

"Awful, ain't it?" said another spectator.

"Yeah," said Pop. He edged up to an officer. "I'm from the *World-Journal*. I want to examine that hole from the bottom."

"Sorry. Can't be done. I got strict orders."

A few minutes later, Pop was wandering about the hole. The street lights were sufficient for his inspection and, very minutely, he covered every inch of the ground. Then, finding nothing he again risked bunions by doing it all over, again without result. He got out

and walked away, toward the site of the Empire State.

On the way he paused and bought some cigarettes, filling his case. When he had finished he wandered on down the avenue.

But his inspection of the hole where the Empire State had stood left him once more without clue. He was very weary and muddy when he had finished, for it was difficult walking.

He stood once more at the curb, determined to make his inspection complete.

"Taxi?"

Pop took out his case and started to extract a cigarette.

"Tax—"

S W O O S S S S H !

And the cab folded into itself with such rapidity that Pop's eye could not follow.

Pop trembled.

He shut his eyes and counted to ten.

When he opened them the cab was still gone.

Then he looked more closely at the pavement and stooped down. Here was the cab, a little less than an inch long and proportionate in the other two dimensions.

Pop put it in his cardboard box.

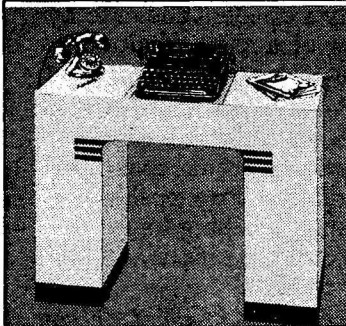
But nobody was near him. Evidently no one had seen this happen to the cab. And if Hannibal had sneaked up and caused it, there had been neither sign nor sound of his approach.

Maybe—maybe Hannibal wasn't guilty.

Maybe New York would keep right on disappearing!

To keep his sanity Pop vowed to complete his inspection. He moved to the next cab in the line in which the driver was dozing. The cabby

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woke with a start and reached automatically back for the door.

"I want to go to Pennsylvania Station," said Pop. And then, finding he still held the cigarette case in his hand, again opened it to take out another cigarette.

S W O O S S S S H !

And this second cab was gone!

Pop began to tremble violently. His heart was beating somewhere near his tonsils. With a quick glance around he reached down and picked up the cab and slid it into his box.

"Hey you," said a loitering cop. "What you doin'?"

"Pi . . . pickin' snipes," said Pop hurriedly.

"Well, get along."

Pop got without further waiting. It was quite clear to him now who was doing this. Himself! The cigarette case! Hadn't it jerked a little whenever these things had gone?

And wasn't he guilty of murder if these drivers and the bartender were dead?

When he was on a dark street he surreptitiously inspected the case by the faint glow of a shop window.

But there wasn't anything unusual about it. Pop looked around and found a trash can. If this case was doing it, it certainly could make this trash can dwindle. Pop pushed the opening button. Nothing happened. He pushed the music button. Again nothing happened.

He breathed a sigh of relief. Then he was wrong about this. It wasn't his cigarette case, after all. Somebody was following him, that was it. Somebody was sneaking up and doing these things to him. Well! He'd walk around and keep close watch and maybe it would happen once more. When his attention was distracted by the case, this other person— Sure, that was the answer.

Pop, feeling better, walked on to the next avenue. He took his stand

on the corner near a large apartment house. This was fair game. And when the other person came near, he would take out his case and then, bow, grab the malefactor and drag him back to the paper for interview.

In a few minutes a fellow in very somber clothes came near. Pop took out his cigarette case and started to open it.

S W O O S S S S H !

And the apartment building was gone!

Pop was shaken up by the vibration of its going but he did not lose his presence of mind. He snatched the bystander and bore him to earth.

The full light of the street lamp shone down.

He had captured a minister of the gospel!

Very swiftly Pop got away from there, leaving the minister staring after him and then, seeing the hole where a building had been, praying.

By a circuitous route, Pop came back to the hole. He almost broke a leg getting down into it, so steep were the sides. But he forgot that when he found the tiny thing which had been a building. It looked like a perfect model, about five inches high. Pop, hearing a crowd gather on the street, got out of there, stuffing the building in his pocket. There was a sting to the object which was very uncomfortable.

All Pop's fine ideas had gone glimmering now. It *was* the case. It had to be. And to test it out he had probably slain hundreds, maybe thousands of people. But his news sense was soon uppermost again.

At a safe distance from the site he again inspected the case. He pressed first one button and then the other and still nothing happened. It shook his orderly process of thought. He went on his way, case in hand, and

found himself in a commercial street where great drays were parked. He went on. Before him was the waterfront.

A packing case stood upon a wharf. Pop chose it for a test and stood there for some time, pushing the case's buttons. But the packing case stayed very stubbornly where it was.

And then, quite by accident, Pop pushed both buttons at once!

S W O O S S S S H !

The liner which had been at the pier abruptly vanished!

There was a snap as the after lines went. There was a small tidal wave as the seas came together.

Pop had missed his aim!

He had gotten over being stunned by now. His first thought was to snatch the hawser which had not parted. He hauled it swiftly in. The ship was barely attached to the line. Very carefully Pop looked at the tiny boat, perfect in all details, but less than three inches long. He looked hurriedly about and shoved it into his pocket.

A steward was running in circles on the dock, yelling, "They've stole it! They've stole it! Help, murder, police! They've stole it!"

That "murder" set badly with Pop. He got out of there.

Ten minutes later he was in a phone booth. The night editor's voice boomed over the wire.

"Joe, this is Pop. Look, I've got a bar, two taxis, an apartment building and an ocean liner in my pocket. Stand by for an extra about midnight."

"You—huh? Sleep it off, Pop. And drink one for me."

"No, no, no!" cried Pop.

But the wire was dead.

Pop walked out of the booth, turned around and walked into it again. He dropped his nickel and

began a series of calls to locate his man.

"*World-Journal*," said Pop at last. "I want Barstow of Pennsylvania Railroad."

"This is Barstow. But I've given out statements until I'm hoarse. Call me tomorrow."

"You'll be at the *World-Journal* in two hours if you want your station back."

"Call me tomorrow," repeated the voice. "And lay off the stuff. It ain't good for you." There was a click.

Pop sighed very deeply.

So they wouldn't believe him, huh? Well, he'd show 'em! He'd show 'em!

And he loped for the station.

V.

"I WON'T," said Hannibal, definite for the first time in his life.

They sat in Caulborn's office and the clock said ten. Caulborn had not yet come in.

Hannibal Pertwee showed signs of having been mauled a bit. And even now he tried to make a break for the door. Pop tripped him and set him back on the chair.

"It's no use," said Hannibal. "I won't tell you or anybody else. After what they did to me, why should I do anything for them?"

In the center of the room sat a gunny sack. Carefully wrapped up within it some items Pop had found occupying the vacant spaces in the vicinity of "New York" on Hannibal Pertwee's toy railway system.

"I'll have you for burglary," said Hannibal. "You can't prove anything at all. What if I do have some models of buildings? Can't I make models of what I please? And they're just models. You'll see!"

"What about those people you can see in them?" said Pop.

"They're not moving. Can't I make people in model form, too?"

Pop was alternating warm and chill, for he knew he was dabbling in very serious matters. Anxiously he looked at the clock. As though by that signal, Caulborn came in.

Caulborn had had a drink too many the evening before and he was in no condition to see Pop.

"What? You here again?"

"That's right," said Pop. "And I have—"

"There's no use begging for that job. We don't need anybody. Get out or I'll have you thrown out." And he reached across the desk for his phone.

Pop's handy feet sent Caulborn sprawling. Pop instead pushed the button.

"Send in Mr. Graw," said Pop, calling for the publisher.

"I'll blacklist you!" cried Caulborn. "You'll never work on another paper!"

"I'll take my chances," said Pop.

Mr. Graw, very portly, stepped in. He saw Pop and scowled. Caulborn was dusting off his pants in protest.

"What's this?" said Mr. Graw.

"He won't get out," said Caulborn. "He sent for you. I didn't."

"Well, of all the check!"

Pop squared off. "Now listen, you two. I been in this business a long time. And I know what a story is worth. You're losing money and you need circulation. Well, the way to get circulation is to get stories. Now!"

"I won't," said Hannibal.

On the table Pop laid out the four objects from the gunny sack, the Pennsylvania Station, Grand Central, Grant's Tomb and the Empire

State. Then from his jacket he took the bar, the two taxis, the apartment house and the steamship.

"I won't!" cried Hannibal, attempting another break. Once more Pop pushed him back to the chair.

"What are these?" said Mr. Graw.

"Just what you see. The missing buildings," said Pop.

"Preposterous! If you have gone to all this trouble just to make some foolish story—"

Pop cut Mr. Graw's speech in half. "I've gone to plenty of trouble, but not to have anything made. These are the real thing."

"Rot," said Caulborn.

"I won't!" said Hannibal.

"Well, in that case," said Pop, "I'll make you a proposition. If I restore these to their proper places, can I have my job back—permanently?"

"Humph," said Mr. Graw. "If you can put back what this city has lost, I'll give you your job back. Yes. But why waste our time—"

"Then call Mr. Barstow of the Pennsylvania Railroad," said Pop. "You get him over here on the double and I'll put the buildings back."

"But how—"

Again Pop cut Mr. Graw down. "Just call, that's all. You can't afford to run the risk of losing this chance."

"If you're talking nonsense—" growled Mr. Graw. But he put through the call.

Caulborn was licking his lips in anticipation of what he would have done to Pop. What Caulborn had suffered in loss of pride yesterday could all be made up today. He'd show Graw!

IT WAS an uncomfortable wait, while Hannibal protested at intervals and Caulborn rubbed his hands.

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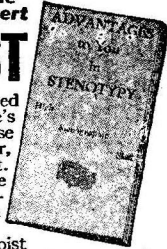
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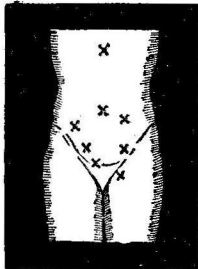
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But at last Mr. Barstow, in a sweat, came loping in.

"You called me, Graw? By God, I hope you've got news."

Graw pointed at Pop. "This idiot claims to have your station. He says this is it."

Barstow snatched up the "model" of Pennsylvania. It stung his hands and he put it back. He turned to Pop. "Is this a joke? That's a perfect replica, certainly, but—"

"Look," said Pop, "this is Hannibal Pertwee, probably the smartest scientist since Moses."

"Oh, you," said Barstow.

"So you know him," said Pop.

"He used to bother us quite a bit," said Barstow. "What is it now?"

"Ah, we get somewhere," said Pop. "Barstow, if this gentleman replaces your Pennsylvania Station and these other objects, will you make a contract with him?"

"About his ideas on freight?" said Barstow. "I don't know which is the craziest statement, that you'll restore the buildings, or that anything he can think up will effect our freight. But go ahead."

Pop yanked out a slip of paper. "I typed this. Sign it."

Smiling indulgently, Barstow signed the agreement. Graw and Caulborn shrugged and witnessed it with their names.

"All right," said Pop to Hannibal. "This is what you used to be begging for. You've got it now. Go ahead."

And indeed Hannibal Pertwee had undergone a change. All trace of sullenness was gone from his face, replaced by growing hope. "You mean," he said to Barstow, "that you'll really consider my propositions? That you may utilize my findings?"

"I've said so in this paper," said Barstow impatiently.

Hannibal rubbed his hands. "Well, you see, gentlemen, my idea was to

reduce freight in size so that it could be shipped easily. And so I analyzed the possibilities of infinite acceleration—”

“Spare the lecture,” said Pop. “Get busy. They won’t understand anything but action.”

“Ah, yes. Action. May I have the cigarette case?”

Pop handed it over.

“You see, you turn it upside down and—”

“Wait!” cried Pop. “My God, you almost made them come back in here. You want to kill all of us?” Hastily he hauled Hannibal outside, taking the bar and a taxi cab with him.

“Now,” said Pop, setting them down in a cleared space.

Hannibal caressed the case. “It was very ingenious, I thought. I had been waiting for this very thing. Apparatus would have been noticed, you see, but this was perfect. One can stand on the edge of a crowd and press the buttons, both together, and the atomic bubble within is set into nearly infinite acceleration. It spins out and engulfs the first whole object it embraces and sets it spinning in four dimensions. Of course, as the object spins at a certain speed, it is accordingly reduced in size. Einstein—”

“Just push the buttons,” said Pop.

“Oh, of course. You see, to stop the object from spinning we have merely to engulf it with an atomic bubble spinning in four dimensions, all opposite to the first—”

“The buttons,” said Pop.

HANNIBAL turned the case around so that it would open down. He pointed it in the general direction of the tiny taxi.

“It compresses time as well as

space,” continued Hannibal. “I just release the bubble—”

S W O O O O S H !

The taxi increased in size like a swiftly inflated balloon. The *tic-tic-tic* of its engine was loud in the room. The cabby finished opening the door and then turned to where he had last seen Pop.

“What address, buddy?” and then he saw his surroundings. He stared, gulped, looked at the ring of reporters and office men and hastily shut off his engine, shaking his head as though punch-drunk.

“Now the bar,” said Pop.

Hannibal pushed the buttons again and, suddenly:

S W O O O O S H !

The bar was there, full size.

The British bartender finished filling the glass with an expert twist of his wrist. “And I says, ‘A sinful city like this will sooner or later—’” He had been turning to put away the bottle. But now he found no mirrors, only the reaches of the City Room. His British calm almost deserted him.

Pop handed the drink to the cabby who instantly tossed it down.

“Now we better not have a bar in this place,” said Pop, “if I know reporters. Cabby, you and the bar-keep step back here out of the way. Do your stuff, Hannibal.”

S W O O S S S S H !

Click, click.

S W O O S S S S H !

And both bar and taxi were toy-sized instantly. The cabby began to wail a protest, but Pop shoved the tiny car into his hands.

“We’ll make it grow up shortly,” said Pop. “Down in the street. Frankie! You and Lawson get some cameras. Freeman, you call the mayor and tell him to gather round for the fun. Sweeney, you write up an extra lead, telling the city all is

well. I'll knock out the story on this—"

"Oh, no, you won't," said Graw.

"Huh?" said Pop. "But you said, in front of witnesses—"

"I don't care what I said. I've suddenly got an idea. Who got out those extras so fast yesterday?"

"Pop did!" yelled Sweeney, instantly joined by a chorus.

Graw turned to Caulborn. "At first I believed you. But when I got to thinking it over after I found out how fast they really had come—"

"He didn't mean nothin' by it," said Pop. "He's just a little young."

"Pop," said Graw, "you can't have his job."

"Well, I didn't say—"

"Pop," said Graw, "I've got a better spot for you than that. You're managing editor. Maybe you can make this son-in-law of mine amount to something if you train him right."

"Mana . . . managing editor?" gaped Pop.

"I'm going to slip out of the job,"

said Graw. "I need rest. And so, Mr. Managing Editor, I leave you to your editions."

The roof-raising cheer which went up from half a hundred throats about them made Pop turn lobster-color. Savagely he faced around.

"Well?" said Pop, "what are you waiting for? We got an extra edition to get out and that means work. Hannibal, you trot along with Frankie and Lawson. They'll help you put them buildings back. And listen, Frankie, don't miss any shots." Hastily he scribbled out the addresses where ship and taxi belonged and then shooed them on their way.

Pop took up the package he had left at the switchboard. He went into the office marked "Managing Editor" and laid his belongings on the desk. He shed his coat, rolled up his sleeves and reached for the phone.

"Copy boy!" he shouted.

"O. K., Pop."

LUBRICATION

SINCE friction exists, it being both necessary and evil, something in the form of a lubricant must be used on bearings that are intended to last. Oils—animal, vegetable or mineral—are, of course, the answer. Sometimes some soap is added, and it's called grease. But there is quite a range of jobs where lubrication becomes a problem for imagination, not specification.

For instance: liquid air making apparatus must function at more than 150°C. below zero, at which temperature oil is, first, not a lubricant and, second, under the circumstances—high concentration of liquid oxygen—as welcome as a charge of nitroglycerine. It makes a swell high-explosive.

Score one for imagination: They use liquid air as a lubricant on the bearings.

Another, somewhat similar problem, arose in the liquefaction and commercial pumping of chlorine, required in tanks in large quantity for such purposes as chlorination of drinking water. Chlorine reacts with oil, taking the hydrogen out and leaving a grimy sort of soot. The "oil" they use is a lubricant, unharmed by chlorine, and, actually, non-corrosive! Pure, one-hundred-percent sulphuric acid—oil of vitriol, the ancients called it.

In addition, in hydro-electric plants, where sand inevitably accompanies the water, bearings would be chewed out pretty swiftly ordinarily. So they use rubber bearings and water as a lubricant. Armor-piercing naval shells use iron as a lubricant—to ease their passage through chilled-steel armorplate. In various other applications, lead, sulphur, and, of course, graphite serve as lubricants.

ARTHUR McCANN.

BRASS TACKS

Continued from page 6

"Discord in Scarlet" presents as strangely poignant a picture of an alien monstrosity as I have ever read. A newcomer, and one with infinite promise, is this van Vogt. His story gets second rating, and not so far behind the Smith epic, either.

Still another newbie, Wallace West, scores third with "Sculptors of Life." Its trump cards were its complex situations, its crackling dialogue and a ding-dong climax of the kind that leaves a reader slumped in his chair making feeble twitching motions. Better still, the yarn was superbly illustrated by Schaeeman.

"Thundering Peace" rates fourth, and de Camp's article fifth. Schaechner has never appealed to me, at least not during the last two years. His "City of the Corporate Mind" is the only mediocre story of the issue.

Two-color illustrations? Well, you must admit that van Vogt's yarn was peculiarly adapted to such treatment. I'd much rather see smooth paper throughout, so long as you have Isip and Schaeeman on the art work. Wesso and Rogers are excellent, also; Rogers especially on the cover. Two cartoonists you can forget are Gilmore and Orban. I'll never forgive the latter for the mess he made of "One Against the Legion." The book jacket was fine, but the rest—ve mortal gods! Another thing that I like is portraits, especially in serials. What I wouldn't give for a treatment of Giles Habibula by Wesso!

As for wants; get another Williamson novel as soon as you can, shorts or novelettes by Robert Block, Don Stuart and van Vogt, and I won't have a thing to kick about.—Bill Brudy, Wolverine, Mich.

Hm-m-m, but Sturgeon said FCC did clamp down.

Dear Mr. Campbell:

The last two issues of Astounding I have been able to lay my hands on—September and December—are just about the best issues of any sci-fi magazine I have read, and I do not mean maybe. What I think of that guy who operates the Lithue Newsstand, however, is something else entirely. I missed the first two installments of Smith's great "Gray Lensman." Which, since the last Smith yarn I had seen before that was "Skylark of Valeron," I made me plenty huhu, as we say down here. Here is my forty cents for the October and November Astounding, which I hope you are not out of yet. Oh, yes; I missed them because he never ordered 'em. If he did order 'em, and there are more sci-fi readers on this rock than I think, someone is gonna be mad at me. . . .

FB's and Flashovers: FB's to Rogers' cover for the September issue. Those spaceships are more like spaceships than anything I have seen yet—also to Schneeman's illustration for

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"Forces Must Balance." That is really some technique—although his idea of a television jigger is pretty bad. On a spaceship they could not waste space like that, and especially on a racer—and those knobs are just artistic license, if there is such a thing. Flashovers to the guy who put Brass Tacks in the middle; I like my B. T., Discussions, and such at the last, and like to breeze from one story to another.

Mr. Drew: You can not neglect friction in the bythebootstrapslifter. If you let friction slide, I cannot think of a way to keep it from working. The catch is the friction developed on the 12-3-6 are, assuming the gadget is rotating clockwise. With all your spokes continually rotating at a constant speed, the weights are also continually pushing outward due to all centrifugal force—and the ring is pushing in, or, rather, preventing from pushing outward, the weights, and what have you got? Friction. A consequent slowing down of the motor. A machine that does not work. Here is how to prove it: Build one and then hold your hand against the part where the weights return to their starting point—but don't hold it there too long!

Paul, or artists—the perennial question: No doubt, at, or most, back covers sans humans. If I looked like one of those things he calls humans, I would not be writing this—I'd be six feet under. He is good on machinery, spaceships, and such, but his humans stink. What color was X1 on the cover of December Astounding? That red again—otherwise the cover was quite O. K. I like the new two-color technique, also; it proves that Astounding is tops in the field. Also the smooth edges, which most other mags have yet to get. Wish you'd give your artists credit lines on the stories where the picture does not take up a full page. I'd help identify 'em—they are occasionally a bit bashful, y'know.

Rogers & Rogers: Evangeline Booth did not start the Salvation Army.

Apparently you never heard of Vachel Lindsay (another man) and his poem, "General William Booth Enters Into Heaven." It is George Elliot, if my memory serves me right, not Elliot.

Damon Knight: D'you mean to say there were nudes in Astounding? Ye gods and petit poisons, of all things! (I have seen worse—one of the newer mags was quite spicy—and I do mean spicy—for its first few issues.)

Asimov: I dare you to sit in the same room with a bottle of ammonia (open), for a half-hour. I can't even walk by the stuff.

Brainstorm: Why not get someone to do a sci-fi "comic" mag, using Weinbaum, Smith, Campbell, Keller, and such, and a couple good artists, only have the story trail under the pics and not in them—like Tarzan usta be in the dailies.

I agree with R. C. Hamilton on "Ether Breathers"; a good yarn, but it could not have happened. The FCC polices the bands too strictly for that, and they clamp down hard on offenders. The yarn about the traveling farmer and the farmer's daughter could not have gone out on the air, although "damn" and "stink" may have got by. Thumbs down on "alea-pill Allice" but not the dancing in the aisles—I think they'd let hep-cats and rug-cutters get by occasionally. And nix on the strip-tease. For all I know, the FCC may now be looking for Mr. Sturgeon.

Another Brainstorm: If you've got one of those really important things that you want on a cover, but not nussed up by type, why not put it on a back or inside cover?

Which just about runs me out.
Aloha.—C. J. (Mike) Fern, Jr., Box 107, Lihue, Hawaii.

Ah, yes! The annual review. Votes for best-of-the-year now open.

Dear Mr. Campbell:

The more I see and read the other science-fiction magazines on the market, the more I like your own.

The December Astounding, for instance, is far superior to any other mag in the field issued during the same period. Your own editorials and comments are tops; the illustrations are sufficiently good—but could be better; most important, your stories are nearly always good, often exceptionally so.

I'd like to mention the stories I thought

really "Astounding," that were published by you during the past year.

January: "Maiden Voyage."

February: "Crucible of Power" and "Lorelei of Space."

March: "Star Crash" and "Follow the Bouncing Ball."

April: "Cosmic Engineers" and "Worlds Don't Care."

May: "The Day is Done" and "Special Flight."

June: "The Morons" and "Done in Oil."

July: "Black Destroyer" and "Trends."

August: "The Luck of Ignatz," "Pleasure Trove," "Stowaway," and "The Blue Giraffe."

September: "Ether Breather" and "Forces Must Balance."

October: "Gray Lensman," "Space Rating," and "A Question of Salvage."

November: "Gray Lensman" and "Habit."

December: "Gray Lensman" and "Thundering Peace."

Lots of my ratings don't check with those in the Analytical Laboratory. In fact, a great many of the yarns, some of them by "name" authors, I didn't care for at all. So what?—Stanley Wells, 235 Noe Street, San Francisco, Calif.

And a competing survey for best-of-the-year!

Dear Mr. Campbell:

The year is at an end once again; therefore, it is almost a command for every fan to whip together his list of "bests" for the year. I like to call myself a fan. Logically, then, I should offer my selection for immortality.

The year produced no outstanding novelettes. These, however, I associate with a pleasurable feeling: "Discord in Scarlet," "The Luck of Ignatz," "The Blue Giraffe," "Pleasure Trove," "Black Destroyer," "Greater than Gods," "The Morons," and "Crucible of Power." In this division "Blue Men of Yrao" and "Cloak of Aesir" tied for last place. "The Last Hope" was a disappointment.

"General Swamp, G. I. C." takes the prize as the dullest tale of the year. The trite "wading-through-a-story" suggests a pun—

Following no logical scheme, I shall now jump to an evaluation of the covers. Two portraits take first place: the one of Saturn and the one of Van Vogt's "Black Destroyer." The latter has an emotional content which easily sets it apart from every other cover.

My vote for the most entertaining story goes to "Ether Breather," by Theodore Sturgeon; the most touching, "The Day is Done," by Lester del Rey; positively the worst in all divisions, "When the Half Gods Go," by A. R. Long; the most meaningful, "Palooka from Jupiter," by Nat Schachner.

The above should give some idea of what one reader likes, but I wonder what *all* the readers think of 1939 in Astounding's history? It would be interesting to find out. May I make this request, then, in order to achieve that end? I would like each reader to mail a penny post card to my address below. This card would give the following information: 1. The best-liked story of 1939; 2. The least-liked story; 3. The best-liked article, and 4. The best-liked cover painting. I shall organize the data and report back to you as quickly as possible. Other points of interest can be written on the card at the writer's discretion. Is this O. K.? (Come on, then, fans!)

I forgot to mention the article I liked best: it is "The Other Side of Astronomy," by R. S. Richardson,—Donn Brazier, 3031 N. Thirty-sixth Street, Milwaukee, Wisconsin.

Cartier's too busy to take on more work.

Dear Campbell:

I'll take a poke at you this month and say that you had one of the poorest story line-ups that you've had in some time.

(1) "Gray Lensman": hot stuff. Only disappointment in this installment was the lack of a terrific mental struggle between the Arisians and the Boskonians. But still—

(2) "Space War Tactics." Good article.

(3) "Habit"—nice. Would like to see Del Rey do some more like "Helen O'Loey." His last few have lacked something.

(4) "Misfit." Just good.

(5) "There Ain't No Such": this article might have been classed higher if the subject matter had been of larger size.

(6) "Power Plant": somewhat vague in spots; somewhat good here and there. Liked it better than I did his last.

"Spacewreck" and "This Ship Kills" tie for a very bad last place. Both sounded like Wellman repeating himself in a different style and different publication. Engelhardt fell flat with his ghost hooley. Wouldn't he need a cat whisker and an amplifier to get sense out of his flying crystal?

Tell us more about what's coming in In Times to Come and I do sorta like to see the letters and discussions in the middle of the mag.

Rogers is an excellent cover man. Koll, Schneeman and Cartier are very good. Why not let Cartier try his exaggerated effect on a cover? Toss Wesso out.

Your Editorial Robots also hit the spot.

An analysis of Jameson's article reveals the following facts:

A fleeing ship will be readily able to dodge attack by gunfire by *lifting just above the firing plane between the two vessels* fighting. This could be done, I believe, fast enough to avoid nearly all shots fired. Of course there's always the accidental element.

Then it seems that the only logical weapon would be a rocket bomb guiding itself at the target. There would be no human element to govern acceleration of any kind. Radio would not do because of the possibility of static interference, et cetera.

Finally war in space seems improbable except in very extraordinary cases. Fighting shall be done in air and on land or under the sea until someone invents Smith's inertialess drive.

I will tell you, if these articles keep up, even the fans themselves will begin to doubt the possibility of things scientificational. Horrid thought!—Dale Tarr, 816 Elm Street, Cincinnati, Ohio.

P. S. Last Unknown almost entirely unsatisfactory. Whassa matter? Monocle okay.

I'd say H₂S would come under the heading "cruel and unusual punishments."

Dear Mr. Campbell:

Unbelievably, I liked the cover for November Astounding. In fact, I liked last month's, too—consider it, all in all, about the best in recent months. If Rogers keeps up this kind of work on the front, hang onto him. But I reiterate: no more Gladney!

Can't comment on "Gray Lensman" for two reasons. One is that I wanted to read "Galactic Patrol" again before starting this one, and haven't finished GP yet. But mainly for fear of having to wait for another installment. Sight unseen, however, I'll nominate it for Astounding's best of 1939, thus beating all the other boys to the wire. In second place, I'd say, would come "Greater Than Gods" and third "Black Destroyer"—both in the same issue! And "One Against the Legion" probably would rank fourth.

I'm not sure what the trouble with "Power Plant" is. It looks like a good story, and yet after I was finished with it I didn't feel any better for the experience of reading the yarn. Too technical, probably. Then, too, there wasn't anything particularly fantastic about it, other than that it was in the future and had an atomic power plant and death-ray.

Heinlein gets my vote for best-story-complete-in-issue. Good work. And let's hope the readers don't overlook the fact that such mathematical marvels have existed. Some time ago, either

Ripley or Hix—memory fails me—had an item on a man, who was supposed to be able to watch a freight train pass, then tell the total of the numbers on the sides of the cars—running up into the millions. And he was supposed to be right. Sounds pretty far-fetched, and yet—

"Habit" is a pretty good example of what a real author can do with a plot after a couple of backs have wrecked it. Though the business of finding different means of utilizing gravitational attractions is becoming a little worn.

When starting to read "This Ship Kills," and three-fourths of the way through, I was all set to tell Engelhardt to come home, all's forgiven. But that last page! I've run across some pretty puerile endings, but this one isn't far from being the worst.

Both pretty good; I admired most his non-explanation of the visitor from space. In such a yarn there's no need to go into long-winded descriptive and explanatory passages, for they merely tend to slow up the story. "Space War Tactics" did a nice job of further debunking the fantasy authors' various space battles. But they shouldn't let Ley and Jameson stop them from using their imaginations, even if it isn't scientifically accurate. And de Camp was fully up to his high standard. I adore those little faces on the animals in Hatcher's drawings!

As you may know, a fan magazine editor can be counted upon to receive practically anything through the mail, with the exception of subscriptions, to his pride and joy. Therefore, Paul Vegenitz recently intruded himself into my mail box—or rather mail slot—with a query about the science note on page 52 of the current Astounding. He says: "If it is true that H₂S is six times as deadly as HCN, why don't they use it in lethal chambers? Then the criminals would go out in an appropriate atmosphere. Why not make the punishment fit the crime?" I don't pretend to know the answer, but maybe you do.

Keep up the excellent work on *Unknown*—but please, no more Prester John. Some more like "None But Lucifer," "Sinister Barrier," "Divide and Rule," and "Returned from Hell"—the theme saved the treatment there—would be liked. And shorts like "The Cloak," "The Misguided Halo," and "The Bronze Door."—Harry Warner, Jr., 363 Bryan Place, Hagerstown, Maryland.

Ignatz may be back—

Dear Mr. Campbell:

Just a letter of appreciation from an avid reader of your magazine ever since when. It has been my intention to write to you for quite some time and let you know what I thought of Astounding. It is undoubtedly tops in science-fiction, and the adoption of smooth edges, *et al*, does mean a lot to your readers. Keep up the good work!

The immediate cause of this letter is one of the stories in the November issue, namely "Misfit," probably as you guessed, because of its direct relationship to the present C. C. C., of which I am now a member. It is a fine organization; and there are a large number of men in this camp who never miss an issue of Astounding. It has been a pet peeve of mine that no one ever gave up a story with the basis that Robert Heinlein produced this month. When he did, well, I just had to write and thank you. Congratulations to you both on a timely tale and a well told one at that.

And so to some plain and fancy blood-letting.

Rating for November: First . . . "Gray Lensman." Second . . . "Misfit." Third . . . "Power Plant." Fourth . . . "Habit." Fifth . . . "Space-wreck," and sixth . . . "This Ship Kills." It is hard choosing. To elaborate: For Heaven's sake, don't let Dr. Smith get away from your magazine. He is the best there is in the field of s.-f. writing, and his present "Gray Lensman" has plenty on the ball. No. 2, "Misfit," as I said before, is new and well told. Plumbs plenty to Mr. Heinlein on this one, and more like it.

Don't let me forget to commend that swell story "General Swamp, C. I. C." Ring the bells

a whole tune-up on that one. And while not wishing anyone at all any bad luck, how about a chaser to "The Luck of Ignatz"? This is definitely upper-bracket material, and very well done up.

As to articles, we'll hand Mr. Jameson the fur-lined beer mug. He really came through with the "Space War Tactics" itinerary. When this outfit bids me farewell next summer, I am taking up engineering, so-o. L. Sprague de Camp's "There Ain't No Such" didn't have the appeal that Jameson's article did.

Covering the covers; how about giving Wesso and Rogers a joint dictatorship on the covers? The covers lately have been fine, especially the Lensman cover on the October issue. It was definitely O. K. Schneeman's illustrations are certainly a swell waste of space. Why not just add a bit more to the stories instead? For instance, why not a longer synopsis on page 9 of the November issue? It would have been more interesting—though one just doesn't need reminders on Dr. Smith's stories. His next one on page 16 helps but little, *et cetera*. But—just turn to page 53, by Wesso! Now ain't that sumpin'? Right up ye old alley, methinks. His next on page 108 is above average too, yes. To go on a point or two, let me nominate Iep for third spot, his pie for "Habit" being up near the limelight in this issue.—Arthur A. White, C.C.C. Camp Moran, SP-1, Olga, Washington.



SCIENCE DISCUSSIONS

Well—they may not be eyes, but they sure are crossed!

Dear Mr. Campbell:

The beautiful thing about s.-f. articles and L. S. de Camp in particular is not only the good solid science handed out in a more-than-pleasing manner, but also the interesting variations on the main theme that immediately come to light to the science student.

Yes, planarias are favorites, and rightly so, too. Not only are they the most primitive structure with a definite head-and-tail end, top and bottom and differentiated sides, it is also the first animal with anything that would pass for a brain. It has two sets of nervous systems, too. The anterioposterior (head to tail) and the "cross" system. The latter sees to it that

both the right and left sides get together in their movements.

Mr. de Camp mentions the marvelous ability of regeneration that planaria possesses. It's interesting to note, however, that if the worm is cut in two too close to the head, the head will not grow another body, as is usually the case, but will grow a second head. Behold, we have a planaria built like a ferryboat! Then, again, if the head end is split longitudinally, the process of regeneration will produce a planaria with two heads placed like the heads of fairy-tale giants.

There is, however, one impression of planaria that the article left that I would like to change. It is true that planaria appears to be cross-eyed. In fact, the more you look at it the more cross-eyed it becomes. But the "eyes" are not eyes in the accepted sense of the word; they are merely light precipitant organs, a far cry from the highly specialized organ we know, but very well suited to planaria's limited need and structure.

There is another little animal, or if you prefer, animalcule, that is deserving of notice because one of its methods of eating seems to be a direct "steal" from the plant family. This is *Euglena viridis*, a member of the great family of one-celled animals, Protozoa. This little animal is often described in both zoological and botanical textbooks because it seems to be an intermediate stage between plants and animals. *Euglena* is small—I might better say microscopic—oval and colored green. At the anterior end is a long whiplike filament called the flagellum, used to procure food and aid in moving about. At the base of the flagellum is a rudimentary mouth or cystostome into which are swept small particles of food material found in the water. Dissolved organic materials in the water comprise part of its food and the rest it manufactures. With the aid of light and the chlorophyll found in body, carbon dioxide and mineral salts in the water are built into food by photosynthesis. *Euglena* is one of a very limited number of one-celled animals that are able to make their own food like plants. Now if that isn't the germ of a story, I've never read a word of s-f.

Of course Dr. Smith takes first place this month. I have a sneaking feeling that he never wrote any better than he did in part two of his current epic. Mr. de Camp's article comes second and Earl Vincent pulls in at third, just using "Space War Tactics" into fourth place. "Habit" comes fifth, and the rest can straggle in any old way. There, that's the first time I've rated both articles along with the stories, and they surely deserved it.

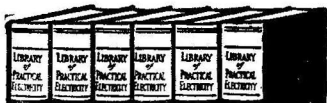
The art work has improved a hundred percent since the summer months. Just about your best artists are working for you now. The cover doesn't seem to mean anything, but it's pretty, so "I ain't kneed." Finlay pulled a dirty punch when he palmed that cover off on us several months ago, and I suggest you forget he exists. If the fans like his style, call in Jack Binder; he used that method of slipping instead of shading when Finlay was still in diapers. And besides, he's a better artist.—Charles Jarvis, 2097 Iglehart Ave., St. Paul, Minn.

Maybe schools don't mention it for fear it'll put ideas in someone's head. Freshmen love to find out why you shouldn't mix strong H₂SO₄ and KMnO₄.

Dear Mr. Campbell:

Phineas McGarrity, commander of the Space Navy Destroyer KP65 1/4, stomped up the ramp and into that worthy tub like grim death going in for a roasting-tube man. In the wake of the mighty struggled two privates, oversized burdens hindering them no little.

"All hands, attention!" blasted the commander, the din in the hollow destroyer forcing all to clap hands to ears. "We are now at war with Mars. In seventy-two point-three seconds we lift into free space to engage each and every enemy ship we cross hairs with. Make ready!"



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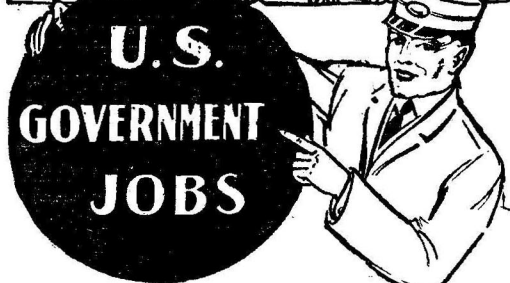
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An officer hurried up. "The packages, sir. Government war plans, I presume."

McCarthy purpled with exasperation. "No, you confounded idiot! They're back numbers of Astounding Science-Fiction. We've never been in a space war before, but all there is to know about one is in those books. Why, there's articles about armament, technique, and all phases of offense, defense, attack and retreat. And the stories are just chock-full of really clever strategy. All right, gentlemen. Get to reading. We'll have this war won before the Martians finish harvesting their pitkowwa bean crop."

"That's a little thick, isn't it? But anyway, when fighting without the stratosphere becomes fashionable, science fictioneers will turn over slightly and say that it was old stuff to them a couple of centuries ago."

A little imagination helped that article on tactics be quite interesting. So radio-rocket torpedoes are No. 1 weapon for skirmishes in vacuo. What will be the fad come next month? Somehow I still have a tender spot for those projectors that will volatilize tungsten at a hundred miles. Where would Dr. Smith be without beams and shields? As I read it, to date, Kinnison has cracked only one nut with a projectile, and he had to hold that one put with beams while he stuck the muzzle in the victim's face.

I would have liked to have read that note on hydrogen sulphide some time ago instead of now. Friends have given my basement lab a clear berth, claiming it reeked to the high heavens—when I could smell nothing whatsoever. I have felt notoriously rotten, sans convulsions, not tying up the disorder with the arch-villain sulphide until way later. In mortal fear of the deadly arsenic, yet smiling freely of hydrogen that was by no means odorless! Why do not high-school instructors at least give note of these seemingly important facts? Or aren't they aware of them? Or are they just hoping to get rid of an annoyance or two for the rest of the semester?

Oh, the folly of youth with raw elements! Phosphorus burns hurt one's fingers, I once found. I've heard talk that it does excellent work under the nails, but fortune denied me this experience. Sodium *likes* water. Hydrogen and air *can* explode, and blow glassware and live all over the place, no eyes spared. Casually drifted from the other side of town a rumor that another enterprising young "chemist" had blown a rock to bits with a drop of nitroglycerin. There were three of us this time. We would also blow a rock to bits. So a short while thereafter we find Jacques walking around the back yard with a tube of "something," cooking a rock suitable for purposes at hand. The "something" got warm and bubbled and gave off some brown fumes; and Jacques actually decided to set the tube down and walk a short distance away as a safety measure. (Sorry to disappoint you. It just wouldn't go off.)

Happy to say, I am still with limbs and head, although there is a slight cloud in the left eye. Experience will teach a lot of things in time, and one of them is that it's far less painful to heed cautionary notes than to disregard them.

And I'd better discontinue relating the perils of Dynamite Jones, and say a word about the big story. Half of "Gray Lensman" has gone by. Just about as fast as the latest model "Skylark" with a half dozen Bergenholms therein. What happened? I like to read about Kinnison, and how good he is; but why doesn't he perform? Action! It's lacking. So far "Galactic Patrol" has it beat by a hundred per-sec. There may be a redemption in the second half. That sphere-of-negation thing looks promising. And what happened to the negative-inertia idea? Smith mentioned it once, and I've been waiting for something unusual ever since.

Did I hear someone say it was a shame Wesso didn't illustrate "Gray Lensman" instead of Schneeman? And that after the messy things that nearly disgraced "Galactic Patrol" I, Gosh, but they sure die hard, these followers of science-fiction.

"Gray Lensman" first. "Power Plant" second. I have nothing further to say.

Please, please, don't hold back Uranus much longer. We've had only one plate this year, and that was seven long months ago.—J. C. Dean, 53 Shrewsbury Avenue, Red Bank, N. J.

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